EPA'S REGULATIONS FOR LAND DISPOSAL OF HAZARDOUS WASTES

HEARINGS

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT

OF THE

COMMITTEE ON
SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

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EPA'S REGULATIONS FOR LAND DISPOSAL OF HAZARDOUS WASTES

TUESDAY, NOVEMBER 30, 1982

House of Representatives,
Committee on Science and Technology,
Subcommittee on Natural Resources, Agriculture
Research and Environment,
Washington, D.C.

The subcommittee met, pursuant to call, at 9:20 a.m., in room 2318, Rayburn House Office Building, Hon. James H. Scheuer (chairman) presiding.

Mr. Scheuer. The subcommittee will come to order.

Today we will hold the first of two sessions of oversight hearings to examine the scientific basis of the Environmental Protection Agency's regulations for land disposal of hazardous wastes. I should say before we start that we have approved the live telecasting of this session by C-SPAN, a private, nonprofit corporation created in 1979 as a public service of the cable television industry, the only television network devoted exclusively to public affairs programing. This has been approved by the subcommittee unanimously.

In these two days of hearings we plan specifically to investigate the technical adequacy of EPA's regulations with respect to ground water protection, and whether it is prudent to continue widespread national reliance on land disposal of hazardous wastes and the degree to which we should consider alternatives such as incineration, detoxification, and ocean dumping.

In the past, improper land disposal practices for hazardous wastes have resulted in some of this country's most notorious environment problems, and specifically in my home State of New York, an abandoned chemical site in the Buffalo area known as Love Canal has become a disaster of such incredible and revolting magnitude that an American President has declared the area a national emergency. Hundreds of families have had to be moved out of their homes, and the dislocation and the anxiety and the fear and the community disorientation has been of unbelievable dimensions.

Now, although substantial improvements have been made in the safe management of hazardous wastes, the Conservation Foundation, a private, nonprofit group has reported that incidents of ground water contamination from land disposal of these wastes continue to increase. Fifty percent of the communities in our country depend for their drinking water on ground water resources. As a matter of fact, Congressman Bill Carney held a hearing in Long

Island on exactly this problem of ground water contamination in the rapidly expanding Long Island community.

Even though there are existing treatment technologies for solid waste disposal such as incineration and detoxification, the economic barriers seem to inhibit very much wider use of these alternatives. The last alternative, ocean dumping, raises a host of questions that will require significant long-term cross-media studies of the comparative environmentally degrading effects of the triad so to speak of disposal techniques for solid waste, that is ocean dumping, incineration, and land disposal. So this very perplexing problem of how you get rid of solid waste is one that is going to plague our society and which is going to demand concentrated thoughtful cross-media research over a long period of time.

Today we will receive testimony on these important issues from representatives of the scientific, technical, and industrial communities. Before we hear from our first panel of distinguished experts, I would like to call upon our ranking minority member of the subcommittee, Bill Carney, who has been actively involved in the ground water problems of his community.

[Mr. Scheuer's prepared statement follows:]

OPENING STATEMENT
HONORABLE JAMES H. SCHEUER
NOVEMBER 30, 1982

THE SUBCOMMITTEE WILL COME TO ORDER.

TODAY WE WILL HOLD THE FIRST OF TWO OVERSIGHT HEARINGS TO EXAMINE THE SCIENTIFIC BASIS OF EPA'S REGULATIONS FOR LAND DISPOSAL OF HAZARDOUS WASTES.

SPECIFICALLY, WE PLAN TO INVESTIGATE THE TECHNICAL ADEQUACY OF EPA'S REGULATIONS WITH RESPECT TO GROUNDWATER PROTECTION AND THE PRUDENCE OF A CONTINUED RELIANCE ON LAND DISPOSAL OF HAZARDOUS WASTES.

IN THE PAST, IMPROPER LAND DISPOSAL PRACTICES FOR HAZARDOUS WASTES HAVE RESULTED IN SOME OF THIS COUNTRY'S MOST SERIOUS ENVIRONMENTAL PROBLEMS.

FOR EXAMPLE, IN MY OWN HOME STATE OF NEW YORK, AN ABANDONED CHEMICAL DUMP SITE KNOWN AS "LOVE CANAL" BECAME A DISASTER OF SUCH MAGNITUDE THAT AN AMERICAN PRESIDENT DECLARED THE AREA A NATIONAL EMERGENCY.

ALTHOUGH SUBSTANTIAL IMPROVEMENTS HAVE BEEN MADE IN SAFELY MANAGING HAZARDOUS WASTES, THE CONSERVATION FOUNDATION HAS REPORTED THAT INCIDENTS OF GROUNDWATER CONTAMINATION FROM LAND DISPOSAL OF THESE WASTES CONTINUE TO INCREASE.

THIS SITUATION IS PARTICULARLY DISCONCERTING SINCE 50 PERCENT OF THIS COUNTRY'S CITIZENS RELY ON GROUNDWATER RESOURCES FOR THEIR POTABLE WATER SUPPLY.

EVEN THOUGH EXISTING TREATMENT TECHNOLOGIES SUCH AS INCINERATION AND DETOXIFICATION CAN REDUCE OUR DEPENDENCY ON LAND DISPOSAL OF HAZARDOUS WASTES, ECONOMIC BARRIERS SEEM TO INHIBIT WIDER USE OF THESE ALTERNATIVES.

IT IS INCUMBENT UPON THIS COMMITTEE, THEREFORE, TO EXAMINE THE DEGREE OF IMMEDIATE AND LONG-TERM PROTECTION THESE REGULATIONS WILL PROVIDE FOR PUBLIC HEALTH AND THE ENVIRONMENT.

TODAY WE WILL RECEIVE TESTIMONY ON THESE IMPORTANT ISSUES FROM REPRESENTATIVES OF THE SCIENTIFIC, TECHNICAL, AND INDUSTRIAL COMMUNITIES.

BEFORE WE HEAR FROM OUR FIRST PANEL, I WOULD LIKE TO TURN TO THE RANKING MINORITY MEMBER OF THE SUBCOMMITTEE, BILL CARNEY, FOR ANY REMARKS HE MAY WISH TO MAKE.

#

Mr. CARNEY. Thank you, Mr. Chairman. These hearings are very timely. I hope that they will be just the beginning of a good 98th Congress on the issue of protecting our ground water and handling the hazardous waste in whatever fashion that is found to be the safest and most prudent way of doing so. As you said before, Mr. Chairman, Long Island relies on a sole-source aquifer for its drinking water source, and areas such as Long Island that do depend on a sole-source aquifer are very understanding of this problem because it is somewhat compounded inasmuch as there is no other source of water for us if that one individual source becomes contaminated. We know that where there are sole-source aquifers, they could rapidly become contaminated, leaving millions of Americans without the potable water necessary to live.

I would like to move on and get to our first witness if I may, Mr. Chairman.

Mr. SCHEUER. Congressman Brown.

Mr. BROWN. No remarks.

Mr. SCHEUER. We will then proceed with our first panel consisting of Mr. William Sanjour, Chief of Hazardous Waste Implementation of the U.S. Environmental Protection Agency, Dr. Kirk W. Brown, professor at Texas A&M University, Mr. David Miller, a geologist with Geraghty & Miller Inc., and Dr. Joel Hirschhorn, Project Director at the Office of Technology Assessment.

We would like to hear each of you speak informally to us summarizing your testimony, hitting the high points in about 5 minutes, and that will give us plenty of time to ask you all questions.

Now, I invited four people up. We have a lovely lady. Would you introduce yourself for the record?

Dr. PIRAGES. Dr. Suellen Pirages, accompanying Dr. Hirschhorn. I am a senior analyst working on the OTA project.

Mr. SCHEUER. We are delighted to have you. I am sure that when we finish this panel we will not have time to ask all the questions that we wish to ask, and I will ask unanimous consent for the record that we hold it open so that we can ask the witnesses additional questions by mail, and hope to get your answers promptly in 8 to 12 days so that we can include them in the printed record.

Having said that, let us hear from William Sanjour, Chief of Hazardous Waste Implementation Branch of EPA.

STATEMENTS OF WILLIAM SANJOUR, CHIEF, HAZARDOUS WASTE IMPLEMENTATION BRANCH, U.S. ENVIRONMENTAL PROTECTION AGENCY; DR. KIRK W. BROWN, PROFESSOR, TEXAS A&M UNIVERSITY; DAVID MILLER, PROFESSIONAL GEOLOGIST, GERAGHTY & MILLER, INC.; AND DR. JOEL HIRSCHHORN, PROJECT DIRECTOR, HAZARDOUS WASTE ASSESSMENT, OFFICE OF TECHNOLOGY ASSESSMENT, ACCOMPANIED BY DR. SUELLEN PIRAGES, SENIOR ANALYST

Mr. SANJOUR. I am William Sanjour, Chief of the Hazardous Waste Implementation Branch, Environmental Protection Agency. I am testifying here today at the request of the subcommittee on my own views of EPA's regulations of hazardous wasteland disposal in the regulations of July 26, 1982.

In 1974, I joined the newly formed Hazardous Waste Division as Chief of the Assessment and Technology Branch. My duties were to supervise the branch in the conduct of studies to assess the hazardous waste problem in the United States and to evaluate the technology for handling it. This work culminated in the passage of the Resource Conservation and Recovery Act in October 1976.

One of the major problems of hazardous waste is the way it is disposed of. Over 90 percent is dumped in surface lagoons or buried in what is euphemistically referred to as landfills. Unlike garbage and human waste, most of these wastes do not degrade, and much of it remains poisonous forever. When hazardous waste is disposed of in or on the ground, it can be carried by rainwater through and over the ground and off the property of the disposer and may eventually end up in someone else's property and water supplies where it can cause miscarriages, cancer, birth defects, and cost a great deal of money for the public to clean up.

Therefore, because of the widespread use of dumping, one of the first studies I had done in 1974 was to determine the degree to which this was actually happening in existing industrial waste disposal sites. The resultant study showed that most if not all the existing industrial landfills in America and lagoons are leaking their contents into the environment.

Mr. Scheuer. What, sir?

Mr. Sanjour. Are leaking into the environment. David Miller, my colleague, was the principal investigator of this study, and he could tell you more details about it. Since we learned that almost all landfills are leaking, currently leaking, it was hoped that landfilling could be made more reliable through engineering. For the next several years, many different technologies were evaluated, including soil attenuation, clay liners, plastic liners, and leachate collection systems. The more research that was done, the more it became clear that containing thousands of tons of semiliquid poison in an unseen underground dam was a bigger technological problem than anyone had anticipated. Thus, by the seventies, the end of the seventies, it was obvious to everyone involved that no one knew how to build a landfill that worked.

The results of this scientific research were not lost on all the interested parties. EPA admitted in the Federal Register in 1981 that even with the application of best available land disposal technology they did not know how to build a landfill that could contain the waste and poison from the environment. The landfill owners and operators themselves confirmed this conclusion by lobbying Congress until they got legislation which would absolve them of any liability for damages caused by the landfills. The insurance companies recognized this research by declaring that they could not issue any long-term insurance on landfills.

In the face of this scientific and engineering data, it was well within EPA's authority and mandate to simply ban the land disposal of all hazardous waste. Yet, they did not. They kept looking for ways to allow landfilling to continue. This determination might make sense if there were no alternatives to land disposal, but this is not the case. Many studies have confirmed the availabilities of alternatives to dumping in landfills. There are techniques such as resource recovery, waste exchange, destruction by incineration, destruction by chemical treatment, biological destruction, and chemical fixation. These technologies are commercially available today. These are things which are operating and, in fact, in existence, but they are not being utilized to their full extent due to the availability of cheap land disposal as competition. In other words, not only are landfills dangerous, and not only are there safer ways of handling hazardous waste than by landfilling, and not only will landfills have to be eventually cleaned up at great public expense, but the very existence of landfills prevents the better methods from being widely used.

Why then does EPA continue to push these dumps? Well, you have to look at the other side of the coin to answer that question. Dumping is very popular with industry because it is cheap. It is cheap because unlike the competing alternatives to dumping, the real cost of dumping is not borne by the producer of the waste or by the disposer, but by the people whose health and property values are destroyed, and by the taxpayers who pay to clean it up.

The list of companies owning the dumps reads like the Fortune 500: General Motors, Du Pont, General Electric, United States Steel, Exxon, Martin Marietta, Eastman Kodak, Union Pacific, et cetera; however, the largest single owner and operator of hazardous waste dumps in America is the U.S. Government. The Defense Department alone owns over 30 hazardous waste dumps. Therefore, put yourself in the place of a minor agency like EPA run by third-string political appointees——

Mr. SCHEUER. I would have to interrupt you and tell you that we do not consider your Agency a minor Agency. We feel that you have a critical mission. We admire your courage in coming here and leveling clear criticism at your own Agency. We consider that you have a major mission and that your Agency has a major mission.

Please continue, but I did want to footnote that one adjective of yours.

Mr. SANJOUR. Would that the administration shared your feelings, sir.

Mr. SCHEUER. We hope that someday a new administration will, and in the meantime we consider it our mission to raise their level of confidence, and this hearing and others are designed to do that.

Mr. SANJOUR. Run by third-string political appointees, an unsympathetic administration is faced with a decision which on one hand is supported by logic and science and is beneficial to the health and financial well-being of the American public and which on the other hand is opposed by the wealthiest most powerful and most influential interests both inside and outside the Government—it will look for a third way. The July 26, 1982 land disposal regulations, which we are here to discuss today, is that third way.

To start with, the regulations admit that landfills do not work and that they will leak. I might point out that the Administrator of EPA in a press conference was quoted in the press as saying that under these regulations all waste must be contained in the disposal site to keep pollution out of the ground water. In fact, the regulations say just the opposite, that they will leak, and that the liners will not contain materials in the landfills.

However, by a very perverted logic this grudging admission leads to a strange conclusion. Since they cannot rely on the technology of landfilling to protect human health and environment, the regulations will rely instead on measures to control the damage done by the failure of the landfill. The preamble considers the land disposal facility as being only the first line of defense. The second line of defense is the monitoring and response program that is designed to remove leachate, that is, poisonous leachate from ground water if it is detected. This is a very innovative and very frightening concept. These are regulations which do not prevent disaster, knowingly do not, but allow it to happen with the promise that they will provide disaster relief. Can we expect EPA to carry this line of thinking into other areas by regulating air pollution by providing gas masks to the public?

But if the concept is bad, what is worse is that it is unworkable. It is unreasonable to expect that these regulations can provide that second line of defense, and therefore there is no way that these regulations can protect human health and environment as required by law. It is as if the Federal Aviation Administrator were to issue an airworthiness certificate to an aircraft based not only on the ability of the aircraft to stay in the air, but on the availability of crash control equipment, and then welshing on that crash equipment.

The first reason why this second line of defense cannot work is because it depends on ground water monitoring to trigger the process. This is a difficult and unreliable process, which I think David Miller will elaborate on. In addition, the monitoring system is run by the operator of the dump and depends on him to discover his own pollution and to turn himself in. While no doubt there will be many honest operators, there is also no doubt there will be many dishonest ones. To put it bluntly, some of these people are the very scum of the Earth. In the real world, the most common way of detecting ground water pollution is in the drinking taps of nearby houses. It is the bodies of American people that almost always is the mechanism by which ground water pollution is detected.

The second issue is cleaning up of ground water. The past history of hazardous waste cleanup activities has shown that complete ground or surface water cleanup is very, very expensive and often impossible. I think Dave Miller can testify to this, too. Again, real world experience has shown that when Government officials allow a landfill to be built and then filled with thousands of tons of poison and then find that it is polluting the ground water, it is too late to force the landfill operator to do any meaningful cleanup. If it is a commercial facility, the operator will argue that if the Government wants him to do cleanup he will go bankrupt and the Government will be stuck with the remedial costs, since the regulations do not require financial assistance for such costs. If it is a manufacturing facility, they will say they will have to close down the plant and put hundreds of people out of work.

In either case, enforcement officials lose all their clout when they allow matters to get so bad that they are only left with draconian solutions. In practice they end up doing things to get themselves off the hook like raising the ground water standards to the level of pollution, or the old standby that they need more studies, more time, more people, et cetera. These regulations are not really standards, but bureaucratic procedures which will require a large bureaucracy to implement. For example, if the landfill leaks into the ground water there are no standards requiring that the people drinking the water be given alternative water supplies or that they be notified that the ground water is poisoned or that the dumping be stopped or that remedial cleanup action be taken. The only requirement is that EPA be notified and after due deliberation EPA will decide on the appropriate action to be taken. Thus, as is likely, if EPA has a larger backlog than anticipated, the pollution will continue until EPA can get around to it.

Mr. **Scheuer**. Given the fact that EPA has substantially cut its staff and, in addition to their cuts, resignations are coming in in an epidemic order of magnitude, do you think it is likely that EPA will be able to monitor?

Mr. **Sanjour**. I think it is ridiculous for EPA to say that the American people are going to believe that.

Mr. **Scheuer**. Your 5 minutes is soon to have elapsed. Would you try and summarize your testimony? That has been a generous estimate of 5 minutes. You have a minute or two to go under that generous estimate.

Mr. **Sanjour**. Let me then just propose a simple three-sentence law which I think could take care of the hazardous waste disposal problem in the United States, and that reads as follows:

> Any person who has a technique for treating a hazardous waste or class of hazardous waste so as to render it nonhazardous may petition the Administrator to certify that technique for that waste or class of waste. One year after certification, land disposal of that waste or class of waste is forbidden. The Administrator may grant a 1-year waiver to a generator of such waste if there are no treatment facilities within 500 miles of the site of generation.

In other words, ban the bad practices and let the marketplace take care of the problem as it can and leave the bureaucracy out of it.

[The prepared statement of Mr. Sanjour follows:]

STATEMENT OF
WILLIAM SANJOUR
CHIEF, HAZARDOUS WASTE IMPLEMENTATION BRANCH
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
HOUSE OF REPRESENTATIVES

NOVEMBER 30, 1982

Mr. Chairman and Members of the Subcommittee, I am William Sanjour, Chief of the Hazardous Waste Implementation Branch of the Environmental Protection Agency (EPA). I am testifying today at the request of the Subcommittee on my own views of EPA's regulations of hazardous waste land disposal facilities of July 26, 1982 (22).

I have been with EPA for ten years, and before that I had been a management consultant and had spent several years working on environmental problems. I have a master's degree in physics and have completed advanced studies in operations research. Prior to joining EPA, I spent twelve years doing operations research in the Navy and in private industry with particular emphasis on the analysis of technological systems.

In 1974, I joined the newly formed Hazardous Waste Division as Chief of the Assessment and Technology Branch. My duties were to supervise the branch in the conduct of studies to assess the breadth and depth of the hazardous waste problem in the U.S. and to evaluate the technology for handling it. This work culminated in October 1976 with the passage of the Resource Conservation and Recovery Act (RCRA). The approach taken in this Act to regulate hazardous waste was basically that approach developed by EPA's

Hazardous Waste Management Division as an outgrowth of these studies. The heart of this Act was the mandate for EPA to write standards for the management of hazardous waste so as to "protect human health and the environment".

For the first two years after the passage of RCRA, I was in charge of writing the standards for the treatment, storage and disposal of hazardous waste. I have previously testified in the Senate (1) of how those regulations were sabotaged by the Administration, how I refused to collaborate with this sabotage and how I was subsequently transferred.

As a result, in addition to my official duties, I have on my own time become a technical advisor to the Citizens Clearinghouse on Hazardous Waste. This organization, founded by Lois Gibbs of Love Canal fame, helps citizens organize to protect themselves against hazardous waste facilities. I have spoken with and advised groups of citizens around the country who are faced with the prospect of hazardous waste dumps in their communities. In doing this I have gained insight into how government and industry actually function in the real world which bears little resemblance to the view from EPA Headquarters.

One of the major problems with hazardous waste is the way it is disposed. Over 90% is dumped either in surface lagoons or buried in what are euphemistically called "landfills". Unlike garbage and human wastes, most of these wastes do not degrade and much of it remains poisonous forever. When hazardous waste is disposed of in or on the ground, it can be carried by rainwater through and over the ground and off the property of the disposer and may eventually end up in or on someone elses property and in public water supplies.

Therefore, because of the widespread use of dumping, one of the first studies I had done was to determine the degree to which this was actually happening in existing industrial disposal sites. The resultant study (2) showed that most, if not all, the existing industrial waste "landfills" and lagoons in America were leaking their contents, frequently toxic, into the environment. David Miller, the principal investigator on this study, is scheduled to be on this panel and can speak to this study in greater detail. The conclusion we drew was that most existing land disposal sites would eventually turn out to be imminent hazards to public health (which later turned out to be the case) and that unless something was done to modify the practice of hazardous waste dumping, this problem would get worse.

It was at first hoped that "landfilling" could be made more reliable by use of "attentuation", that is the natural tendency for some soils to adsorb some chemicals, but research soon demonstrated that this was a transient and unpredictable phenomenon (28). The next great hope was liners and then leachate collection systems.

At first confidence in clay liners was so high that a member of my staff was sent in 1977 to testify in behalf of Earthline Corporation when the citizens of Wilsonville, Illinois tried to close down their "secure" clay lined hazardous waste "landfill". Later research at Wilsonville and elsewhere showed that the citizens were right and that we experts were wrong again and that the imperviousness that clay liners showed in the laboratory could not be duplicated in the field (3,4,5,10). In particular, when Love Canal burst onto the national scene, a little reported fact was that the clay lined canal far exceeded our thinking at the time at EPA as to what was required to line a hazardous waste "landfill".

Plastic liners also were unpredictable and what little field data existed did not prove otherwise (6). Professor Kirk Brown who has been EPA's principal investigator in this area is also scheduled to be on this panel and can give you far more details on the ability of liners to assure protection of public health from dumps.

New schemes for pumping out liquids from "landfills" called "leachate collection" were also proposed. Again what little field data exists (7) shows this to be still another gimmick which doesn't work.

Two studies in particular, are very important to this issue and to these hearings because they report on field investigations of some of the few hazardous waste "landfills" built within the last few years with much of the high technology gimmickry on which EPA has based its hopes. In a sense these two studies are a continuation of the field study referenced earlier (2) by David Miller as they represent the attempted answer to the widespread failures found in that earlier study. Because of their importance I have attached copies of these papers to my testimony. The first of these studies, by Peter Skinner (7), reports on several "secure landfills" in New York State which take in huge quantities of industrial toxic wastes from all over the country. The second study is by Peter Montague (6) deals with four even newer "high technology landfills" in New Jersey. Some specific findings of these studies of particular interest are:

- ° The New York study shows that the leachate collection systems at the "landfills" are not working thus creating an underground dam where the pressure of poisoned liquids is building up.
- ° One of these "landfills" is one of the largest recipients of hazardous waste from the clean up of other hazardous waste sites around the country under "Superfund".
- ° In New Jersey both clay and plastic liners were penetrated by the wastes in a matter of months.
- ° The State of New Jersey was unable to require the "landfills" to comply with the performance they had promised.

In testimony before the Assembly of California (8) Peter Skinner summarized the consequences of these studies of "secure landfills":

> ". . . these quasi-engineered pits are no more than in situ repository experiments, backed up by neither defensible scientific proof of adequate on site performance nor component by component laboratory testing. Turning over our toxic waste to "secure" landfills operators, therefore, is little wiser than sending it to halls of the medieval alchemist. It is clear to me that the costs of repairing the inevitable cap failures and mitigating the probable migration plumes for each landfill will be million dollar propositions. Since these difficulties will occur years or perhaps decades after closure, the likelihood is low that the facility developer or even adequate funds in trust for the job will be available. Like Love Canal today, taxpayers will be forced to shoulder the burdens industry should have preapred for long before."

Thus, by end of the seventies it was obvious to everyone who had been involved with technical issues of land disposal that no one knew how to build a "landfill" that worked. In a rare moment of candor EPA published an excellent summary of the problem in the FEDERAL REGISTER on February 5, 1981 (9). I have attached this discussion at the end and I would like to quote one paragraph here.

> "There is a good theoretical and empirical evidence that the hazardous constituents which are placed in land disposal facilities very likely will migrate from the facility into the broader environment. This may occur several years, even many decades after placement of the waste in the facility, but data and scientific prediction indicate that, in most cases, even with the application of best available land disposal technology, it will occur eventually." (emphasis mine)

The "landfill" owners and operators confirmed this conclusion by lobbying Congress intensively for years to get legislation which would absolve them of any liability for damages caused by their "landfills" five years after they close. (I think it is one of the blackest pages in the history of this body that such relief was granted (11) and as part of the "Superfund" law which was ostensively written to aid victims of hazardous waste disposal.)

Not only were government and industry aware of the fact that they didn't know how to make "landfills" work, but insurance companies as well. At the Congressional hearings for "Superfund" insurance companies testified that they would not provide long term insurance for "landfills", and the Department of the Treasury's fiscal service submitted comments concluding the premiums for liability insurance would be prohibitive and that individual insurance companies offering such coverage might go out of business (12).

After the passage of "Superfund" it became clear that most of the cost was not going to clean up after "midnight dumpers" but rather that 80% of EPA's priority sites were legitimate legally operated "landfills" (29). Since these dumps do not differ in any way but age from 900 dumps currently permitted under Federal law, one could conclude that "Superfund" may be eventually called upon to clean up most of these at an estimated cost of $4 million apiece, not including liability costs.

In the face of all this scientific and engineering and other data it was well within EPA's authority and mandate to "protect human health and environment" to simply ban the land disposal of all or most hazardous wastes. Yet they did not. They kept looking for ways to allow "landfilling" to continue. (I could devote several pages of testimony on this loophole making activity). This determination might make sense if there were no alternatives to land disposal, but this is not the case. As early as 1973, EPA had written in a report to Congress (13):

> "The technology for hazardous waste management generally is adequate. A wide array of treatment and disposal options is available for management of most hazardous wastes. The technology is in use today, but the use is not widespread because of economic barriers in the absence of legislation."
>
> ". . . legislation which mandates adequate treatment and disposal of such wastes is absent or limited in scope. The consequence is that generators of hazardous wastes can use low-cost but environmentally unacceptable methods of handling these residues."

Many studies since then by myself and others (14,15,16,17,18, 19,20) have confirmed the availability of alternatives to the dumping of hazardous waste and since a spokesman for many of the firms which offer such alternatives is one of your scheduled speakers, I won't belabor the point except to quote from a recent study from the State of California (21):

> "The costs of securing or cleaning up past disposal sites are rapidly approaching such a magnitude that government and industry together cannot afford them. Unless we permanently detoxify or encapsulate the most toxic and long-lived wastes, we are risking future cleanup costs that make land disposal a very bad bargain." And that technologies "are commercially available today, but have not been utilized in California due to the availability of inexpensively priced land disposal."

In other words, not only are "landfills" dangerous and not only are there safer ways of handling hazardous waste than by "landfilling" and not only will "landfills" have to be eventually cleaned up at great public expense but the very existence of "landfills" prevents the better methods from being widely used. Why then does EPA continue to push these dumps?

To answer that question I think we have to look at the reasons why we should have dumps rather than the reasons we should not have them. Dumping is popular because it is cheap. It is cheap because unlike the competing alternatives, the real cost of dumping is not borne by the producer of the waste or by the disposer but by the people whose health and property values are destroyed when the wastes migrate onto their property and by the taxpayers who pay to clean it up.

There are now about 900 hazardous waste dumps in the United States permitted by Federal law. The list of companies which own them reads like the "Fortune five hundred". Companies like General Motors, Dupont, General Electric, United States Steel, Exxon, Martin Marietta, Eastman Kodak, Union Pacific etc., etc. However, the largest single owner and operator of hazardous waste dumps in America is the United States Government. The Defense Department alone owns about 30 hazardous waste dumps.

Therefore, when a minor agency like EPA, run by third-string political appointees of an unsympathetic Administration is faced with a decision which on one hand is supported by logic and science and is beneficial to the health and financial well-being of the American public and which on the other hand is opposed by the wealthiest most powerful and most influential interests inside and outside the government--it will look for a third way. The July 26, 1982, land disposal regulations, which we are here to discuss today, is that third way, it will look to those in the career civil service who are willing to pervert their knowledge and experience to provide the third way.

To start with, the preamble and background documents to the regulations admit that "landfills" don't work. To do otherwise would force the Agency to contradict its own research results. But there is not the forthright discussion of the issues as took place in the preamble to the February 5, 1981, proposed regulations (9). For example:

> "EPA's view of the function of a liner contrasts somewhat with that of some members of the public and the regulated community. Some have argued that liners are devices that provide a perpetual seal against any migration from a waste management unit. EPA has concluded that the more reasonable assumption, based on what is known about the pressures placed on liners over time, is that any liner will begin to leak eventually." (22)

> "Therefore, EPA has concluded that its regulatory strategy should seek to provide long-term protection, but it should not profess to provide protection for infinity. EPA considered whether it should specify some fixed time period that would provide an outer bound on how long it can reasonably expect to assure ground water protection. At this time, EPA simply has not been able to develop an adequate rationale for such a time frame." (22)

> "Essentially complete but temporal containment is practical using the synthetic liners developed over recent years. However, experience with synthetic liners in contact with chemicals is relatively recent. As a result, EPA has no experience base from which to predict the life of these materials. However, predictions based on chemistry, and limited recent real world experience are sufficient to convince the Agency that with proper selection for resistance to chemicals at the site and proper design and installation (tight seams and no tears), containment for at least 30 years or more is practical, utilizing a single synthetic liner (some believe that such liners will last in excess of 100 years)." (23)

By a very perverted logic, this grudging admission leads to a strange conclusion. Since they cannot rely on the technology of "landfilling" to protect human health and the environment, the regulations, therefore, will rely instead on measures to control the damage done by failure of the "landfill". The preamble considers the land disposal facility as being only "the first line of defense".

> "The other element of the general strategy is a ground-water monitoring and response program that is designed to remove leachate from the ground water if it is detected. The monitoring and response program serves as backup to the liquids management strategy." (22)

This is a very frightening concept. Regulations which instead of preventing disaster, knowingly allow it by promising to provide disaster relief. Can we expect EPA to carry this line of thinking into other areas by issuing gas masks as a means of regulating air pollution? Or by stockpiling canned fish and tetnus injections to regulate water pollution?

But if the concept is bad, what is worse is that it is unworkable. For many different reasons, which I will go into, it is unreasonable to expect that these regulations can provide that second line of defense and therefore, there is no way that these regulations can protect human health and the environment as required by law. It is as if the Federal Aviation Administration were to issue an airworthiness certificate to an aircraft based not on the ability of the aircraft to stay up in the air but on the availability of crash control equipment and then welshing on the crash equipment.

The reasons why this disaster relief approach cannot work are:

1) Monitoring for groundwater pollution is unreliable.
2) Cleaning up groundwater pollution is almost impossible.
3) EPA does not have sufficient staff to implement such a scheme.
4) There are no standards on how this groundwater protection plan is to be administered. It is left to the discretion of political appointees.

I will elaborate on these points in the next few paragraphs.

The first reason why this second line of defense cannot work is because it depends on groundwater monitoring to trigger the process. Groundwater monitoring is difficult and unreliable. Unlike surface water, pollution moves through groundwater in narrow stripes or plumes which are difficult to detect. There are numerous instances of polluted groundwater going undetected by groundwater monitoring systems. David Miller, who is an expert on this subject, can tell you much more about it. In addition, the groundwater monitoring system is run by the operator of the dump and depends on him to discover his pollution and to turn himself in. While no doubt there will be many honest operators, there is also no doubt there will be many dishonest ones. One need only review the record of criminal prosecutions in hazardous waste management in the last several years.

I have spent many years studying damages done by hazardous waste. The most common way of detecting groundwater pollution plumes is in the drinking water taps of nearby houses. The most common monitoring device is people. The typical pattern (24,25,26) is that citizens' complaints about their drinking water are met with a bureaucratic run-around from the health authorities for years and only by organizing and by making a thorough nuisance of themselves can they get the authorities to act. And often the action consists of shutting down the wells and charging the citizens to connect up to water pipes.

This brings us to the second issue which is the cleaning up of polluted groundwater. I'm sure David Miller's testimony will go into this in great detail so I will just quote the conclusion of EPA's own scientists in reporting on a survey of the past history of hazardous waste remedial action activities (27).

> "The survey and case histories indicated that remedial measures were usually confined to containment and/or removal of the hazardous wastes with a primary goal being to prevent further contamination of the environment rather than complete cleanup. Complete environmental cleanup of groundwater or surface water can require sophisticated technologies, large sums of money, and/or long periods of time. Therefore, a responsible party with sufficient funds and expertise must be located to effect complete cleanup. In most cases, sufficient funds have not been available for effective remedial action. The EPA is available to provide only limited remedial funding under Section 311

> of the Clean Water Act. Further, State and local governments cannot typically provide sufficient money for total cleanup since any one site may require millions of dollars to correct its problems.
>
> "Based on the case studies and survey, the present state-of-the-practice for remedial actions does not look favorable when considering that the applied remedial actions was ineffective 46 percent of the time and only a portion of all uncontrolled sites have received some form of remedial action. In addition, remedial action applied at a site experiencing problems was totally effective only 16 percent of the time."

Real world experience has shown that when government officials allow a "landfill" to be built and then filled with thousands of tons of waste and then find it is polluting the groundwater, it is too late to force the "landfill" owner to do any meaningful clean up. If it is a commercial facility the operator will argue that if the government requires him to do a thorough clean up he will have to go bankrupt and the government will be stuck with the remedial costs since the regulations do not require financial assurance for such costs. If it is a manufacturing facility they will say that they will have to close down the plant and put hundreds of people out of work.

In either case, enforcement officials lose all of their clout when they allow matters to get so bad that they are only left with draconian solutions. In practice they end up doing things to get themselves off the hook like raising the drinking water standards to the level of the pollution; or suddenly finding out that they cannot determine the unique source of pollution; or they will reach a compromise solution for some lesser form of remedial action.

which historically has meant that the dumps continue to operate and continue to pollute; or they use the good old stand-bys that they need more studies or more money or more people or more time etc., etc.

The third issue is that these regulations are not really standards but bureaucratic procedures which will require a large bureaucracy to implement. In the regulations governing the lining of the "landfill" for example: they do not specify a design standard which would say something like a "clay liner must be at least two feet thick and have a permeability of not more than 10^{-7} centimeters per second" but rather that EPA in evaluating the permit application will make a determination of whether sufficient information has been provided to demonstrate that the "landfill" has a liner designed to prevent leakage during its operating life. And rather than the regulations specifying what chemicals to monitor for in the groundwater, EPA will make a case by case determination for each "landfill". If the "landfill" leaks into the groundwater, there are no regulations requiring that the people drinking the water be given alternative water supplies or that they even be notified, or that the dumping be stopped, or that remedial clean up action be taken. The only requirement is that EPA be notified and after due deliberation EPA will decide on the appropriate action to be taken. Thus, as is likely, if EPA has a larger backlog than it can handle, the pollution continues unabated until EPA can get around to it.

In other words these regulations do not tell anyone what and what not to do but instead tells them when to come to EPA and

EPA will decide in each and every case what should be done. All actions are funneled through the bureaucracy and nothing is done until EPA says so. The EPA permit system is the sole means of regulating dumps, supplanting even common law.

EPA anticpates that issuing land disposal permits will be very labor intensive. But because the technology of "landfilling" is inherently unworkable, once the permits are issued they generate even more paperwork and personnel requirements. An unworkable system generates a lot of work; including monitoring reports, compliance reports, corrective action programs, and revised financial assurance plans, closure plans, post closure plans, contingency plans. . . .ad infinitum.

While the regulations place great demands on EPA staff they make no provision for assuring that they will have sufficient staff. EPA is asking the public in communities where their lives and property are at stake to take on faith that an administration which is pledged to reduce the regulatory burden on industry and to slash away at the size of the bureaucracy, will nevertheless give its full support to these highly bureaucratic regulations and their ever increasing demands.

The final reason why the "second line of defense" is unworkable is that the regulations do not specify the level of protection to human health and the environment to be achieved. This is left to the discretion of the EPA Regional Administrators, unless the program is transfered to the states. To illustrate this, I have extracted excerpts from just one section, Subpart F - Groundwater Protection.

§264.90(b)(4) "The owner or operator is not subject to regulation under this subpart if the Regional Administrator finds that there is no potential for migration of liquid from a regulated unit..."

§264.93(b) "The Regional Administrator will exclude an Appendix VIII constituent from the list of hazardous constituents specified in the facility permit if he finds that the constituent is not capable of posing a substantial present or potential hazard to human health or the environment."

§264.94(a) "The Regional Administrator will specify in the facility permit concentration limits in the groundwater for hazardous constituents..."

§264.94(b) "The Regional Administrator will establish an alternate concentration limit for a hazardous constituent if he finds that the constituent will not pose a substantial present or potential hazard to human health or the environment..."

§264.96(a) "The Regional Administrator will specify in the facility permit the compliance period during which the groundwater protection standard...applies."

§264.98(a) "The Regional Administrator will specify the parameters or constituents to be monitored..."

§264.99(a) "The Regional Administrator will specify the groundwater protection standard..."

§264.99(c) "...the Regional Administrator will specify the concentration limit..."

The standards could be very protective of human health and the environment or not very protective at all. There is no way to tell in advance since there is no "bottom line" in the regulations. Therefore, we cannot evaluate the regulations without evaluating the people to whom the regulations have delegated their authority.

Regional Administrators are usually appointed by a newly elected administration from the ranks of loyal party workers as a reward for their efforts on behalf of the winning candidate. Most have no environmental experience and many in this administration are outspokenly pro-business, anti-regulation and anti-environment. EPA is telling the American people that what these 114 pages of regulations boil down to in the end is that the final decision on the degree of security of their life, health and property will be made by someone who got his job through the "spoils sytem" and is not subject to any hard and fast standards of human health protection

In those states with an authorized hazardous waste program, these decisions are delegated to the state rather than the EPA Regional Administrator. Therefore, every authorized State will be free to set its own level of human health and environmental protection. Some states will set high levels and some States which wish to attract industry from the States with high levels, will set low levels. This is precisely the state-of-affairs which existed before Congress passed RCRA for the purpose of setting minimum standards which would be applied throughout the country.

That is the extent of my review of the new EPA land disposal regulations. I would like to make a few miscellaneous comments on related subjects before I conclude.

First, I would like to address the comment I often hear that while liners may not stop leakage from a "landfill" they have the virtue of slowing it down. This is not a virture. If a dump is going to leak sooner or later then it is better for the adjacent community that it leak sooner. The longer it takes to leak the less wary they will be and the more likely they will have built houses and schools near the site and slack off on monitoring and maintenance. The sooner the pollution is discovered the better chance they have of finding a responsible party to clean up and pay for damages.

Thus, I have to take exception with some of my friends in the environmental movement who have advocated retrofitting liners on existing dumps. This technology will not only cost enough to retire the national debt but it doesn't work and it will do the neighboring community more harm then good. The only ones who benefit by liners and by delaying the inevitable are the polluters and the environmental officials who both hope to be long gone when the problem is discovered.

In regard to long-gone officials, the credibility of EPA and the government is frequently compromised by persons in high levels who leave the Agency for the payroll of the very people they were suppdsed to regulate. In particular, one of the largest dump operators in America is now paying for the services of the principal author of these land disposal regulations to promote the safety of their dump sites. This is still one more reason for the people living near these dumps to question the honesty and sincerity of their government.

Lastly, in contrast to the convoluted and tortuous logic of EPA's land disposal regulations, I would like to propose a three-sentence law which I think would resolve the land disposal issue for all time.

"Any person who has a technique for treating a hazardous waste or class of hazardous waste so as to render it non-hazardous may petition the Administrator to certify that technique for that waste or class of waste. One year after certification, land disposal of that waste or class of waste is forbidden. The Administrator may grant a one year waiver to a generator of such waste if there are no treatment facilities within five hundred miles of the site of generation."

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Part II

Environmental Protection Agency

Hazardous Waste Management System; Standards Applicable to Owners and Operators of Treatment, Storage, and Disposal Facilities; and Permit Program

III. The Problem Being Addressed

Land disposal of hazardous waste constitutes placement of hazardous constituents in or on the land where they are intended to remain forever.[1] As such, hazardous waste land disposal constitutes deliberate and direct placement of hazardous waste in the environment (e.g., in a landfill, a surface impoundment or a land treatment facility), albeit in a confined segment of the environment. This presents two problems: (1) The waste and its hazardous constituents may remain hazardous for a long period of time (up to hundreds of years) and, in some cases, forever (e.g., toxic heavy-metal constituents) and (2) the waste or its constituents and byproducts may migrate from the confines of the land disposal facility into the broader environment.

Many hazardous wastes placed in land disposal facilities will not degrade to a point where they are no longer hazardous, or will do so only very slowly. Toxic heavy metals, for example, will not degrade; although, in certain cases, their ionic state may be altered to make them more or less toxic (e.g., converting the hexavalent form of chromium to the trivalent). Toxic organic constituents may degrade in the anaerobic condition of a landfill, but this degradation is usually slow (taking anywhere from a few years to 100 years or more) and may not be complete, leaving toxic degradation products. Moreover, current scientific knowledge about the degradation of hazardous wastes placed in land disposal facilities is imperfect. For these two reasons, it is necessary to assume, at this time at least, that hazardous wastes and hazardous constituents placed in a land disposal facility will remain hazardous for very long periods of time and therefore will remain a potential hazard to human health and the environment for very long periods of time.

There is good theoretical and empirical evidence that the hazardous constituents which are placed in land disposal facilities very likely will migrate from the facility into the broader environment. This may occur several years, even many decades, after placement of the waste in the facility, but data and scientific prediction indicate that, in most cases, even with the application of best available land disposal technology, it will occur eventually.

Natural water, from precipitation or from other sources (e.g., groundwater) will inevitably infiltrate into the facility unless a water-tight containment system (e.g., landfill cover) is constructed and *perpetually* maintained to prevent such intrusion. In addition, there inevitably will be liquids within the wastes placed in the facility (this is particularly true for surface impoundments but also will be true for landfill even with the prohibition of disposal of bulk and containerized liquid wastes). Once in the facility, such water or liquid generates leachate, principally by solubilizing hazardous constituents in the waste. Such leachate inevitably leaks out of the facility and migrates into the underlying soils and groundwater, unless a containment system (e.g., a landfill or surface impoundment liner and/or leachate collection system) is constructed and *perpetually* maintained. This process of natural water infiltration or liquid inclusion, leachate generation and leachate migration into the environment results in the discharge of hazardous constituents into the broader environment.

Although it is technically possible to design and construct a land disposal containment system consisting of an impermeable liner and cover and a leachate collection system to interrupt this process, EPA seriously questioned whether such systems can be maintained and made to operate effectively and efficiently for long periods of time, or perpetually where this is required. Natural materials such as very low permeability clay soils that might be used for liners or covers are not impermeable. They possess some degree of permeability that allows infiltrating water or exfiltrating leachate to slowly but inevitably migrate through the material. Manmade impermeable materials that might be used for liners or covers (e.g., membrane liners or other materials) are subject to eventual deterioration, and although this might not occur for 10, 20 or more years, it eventually occurs and, when it does, leachate will migrate out of the facility. Additionally, these manmade impervious materials are subject to physical rupture during both placement and operation. When ruptured, they obviously allow leakage of leachate. Finally, leachate collection systems have some collection efficiency less than 100 percent even when newly constructed and, over time, may lose efficiency by plugging and deterioration. More important, however, to be effective, they must be maintained and operated and the leachate collected must be treated or otherwise managed as a hazardous waste. If leachate is produced for a long period of time, then the leachate collection and management system must be operated for a long period of time. Therefore, where leachate collection is an essential part of a land disposal containment system, then long-term maintenance and operation of the collection system and long-term management of the leachate collected is imperative.

As discussed, man's ability to prevent generation and containment of leachate has technical limitations. However, perhaps the more important limitations are institutional limitations. Given that hazardous wastes and hazardous constituents may not degrade or may only degrade slowly—an assumption that must be made in most cases—their potential to generate hazardous leachate continues for very long periods of time. Given further that the technical wherewithal to prevent leachate generation and contain and treat any leachate that is generated depends more on maintenance and operation of containment and treatment systems than on the satisfactory design and construction of such systems, the institutional arrangements for long-term maintenance and operation of such systems become extremely important. There is considerable doubt about whether the owners and operators of land disposal facilities can provide the long-term maintenance and operation of containment systems required to control leachate generation and migration and confine hazardous wastes and hazardous constituents to the confines of the land disposal facility. The requirements of Subparts G in both Parts 264 and 265, require post-closure care and maintenance of land disposal facilities for at least 30 years. Although the regulations allow EPA to require post-closure care and maintenance required for periods greater than 30 years where necessary to protect human health and the environment, there will clearly be some finite limit to the extended time periods that can reasonably and practicably be required and complied with. If 30 years or some longer required time period is not sufficiently long to exceed the potential for leachate generation and migration, then only two options are available: providing for some public body or other institutional mechanism to assume responsibility for continuing post-closure care and maintenance, or predicting and expecting control of leachate generation and containment for only a finite period and basing the issuance of land disposal permits on the eventual cessation of post-closure care and maintenance and the inevitable migration of leachate from the facility into the broader environment. At the present time, few, if any, institutional mechanisms exist for public assumption of post closure care. Thus, EPA believes that the problem of inevitable leachate generation and migration and concommitant limited ability to technically and institutionally prevent or control such leachate generation and migration should be squarely faced and dealt with in the development of land disposal standards.

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[1] Placement of such waste into or on the land for a finite period with intent to remove it for subsequent storage, treatment or disposal would be considered and regulated as hazardous waste storage.

The potential for leachate generation and migration into the broader environment is not the only long-term problem associated with the land disposal of hazardous wastes. Migration of volatile hazardous constituents out of the land disposal facility and into the atmosphere also is possible in many cases (e.g., the migration of volatile carcinogenic constituents into the basements of homes in the Love Canal area). Generation and migration of toxic or explosive gases (e.g., methane from the anaerobic biodegradation of organic wastes) over a long period of time also can be a problem. Land disposal of ignitable or reactive wastes which have not been pretreated can present a long-term fire or explosion potential, unless or until such wastes degrade into non-ignitable or non-reactive forms or are otherwise rendered non-ignitable or non-reactive by leaching or other actions. Finally, the mere existence of hazardous wastes and hazardous constituents in or on the land can pose a long-term hazard in the event that future land-use activities serve to expose these hazardous wastes where humans can come into direct and harmful contact with them (as occurred also at Love Canal) or where they are even more readily transported into the broader environment. As with leachate generation and migration, man's ability to technically and institutionally manage and control these long-term problems is limited.

As discussed, the essence of the problems faced in the regulation of the land disposal of hazardous waste is the inevitable long-term potential for the wastes or their hazardous constituents to leak out of the facility. If it were technically and institutionally possible to contain wastes and their constituents in land disposal facilities forever or until degradation mechanisms rendered them non-hazardous, then the problem of regulating such land disposal would be comparatively simple and straightforward. It would entail development of reasonably specific (but flexible) design and operating standards or, alternatively, containment performance standards specifying total containment of hazardous wastes and their constituents within the land disposal facility forever or until degradation mechanisms rendered them non-hazardous, as the case may be. Unfortunately, at the present time, it is not technologically and institutionally possible to contain wastes and constituents forever or for the long time periods that may be necessary to allow adequate degradation to be achieved. Moreover, if degradation of the hazardousness of waste does, in fact, occur, current state-of-knowledge does not know what the degradation periods are for most, if not all, hazardous wastes and, therefore, does not know what containment time periods to specify. Consequently, the regulation of hazardous waste land disposal must proceed from the assumption that migration of hazardous wastes and their constituents and by-products from a land disposal facility will inevitably occur.

Dated: January 17, 1981
Douglas M. Costle,
Administrator.

FOUR SECURE LANDFILLS IN NEW JERSEY — A STUDY OF THE STATE OF THE ART IN SHALLOW BURIAL WASTE DISPOSAL TECHNOLOGY

DRAFT of February 1, 1981

Peter Montague, Ph.D.

Department of Chemical Engineering
and
Center for Energy and Environmental Studies
School of Engineering/Applied Science
Princeton University
Princeton, NJ 08544

This paper may be cited or quoted with the proviso that its DRAFT status be duly noted. The description of each landfill is followed by a series of questions which remain to be answered before the study can be considered completed.

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FOUR SECURE LANDFILLS IN NEW JERSEY — A STUDY OF THE STATE OF THE ART IN SHALLOW BURIAL WASTE DISPOSAL TECHNOLOGY*

DRAFT of February 1, 1981

Peter Montague

INTRODUCTION

A landfill is a depression in the ground where trash and garbage are put. If the trash and garbage are simply heaped up, the place is called a dump, or an "open dump". If soil is pushed over the trash daily, to keep rodents and people and wind from dispersing the material, it is termed a "sanitary landfill".

When it rains, water enters a landfill and seeps into the trash. The water dissolves some of the trash. The liquid that seeps out the bottom and sides of a landfill is called "leachate" and it is toxic.[1]

Leachate has caused water pollution problems in the past,[2] and so in the early 1970s engineers developed a new concept in landfills. The landfill site is specially prepared. A liner is laid down in the earth before any trash is dumped. The liner can be made of asphalt, clay, rubber, or a plastic such as PVC (polyvinyl chloride), or Hypalon.* This kind of facility is called a "lined landfill". Typically in a lined landfill, there is a "leachate collection system" consisting of pipes and a pump. The leachate collects in the lowest place in a lined landfill (the "leachate sump"); from there a pump moves the leachate to a wastewater treatment plant (similar to a sewage treatment plant). Here the leachate is treated to separate the solids from the liquids. The remaining liquids may be subjected to further treatment, to reduce their pollution potential before they are released. The liquids are then, typically, released into some body of surface water. The solids are transported back to the landfill. Solid wastes going into a landfill may be "drummed" (packed into barrels because they are considered dangerous or unpleasant to handle) or they may be "bulk" wastes -- carried in trucks with no special packaging.

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* This paper may be cited or quoted with the proviso that its DRAFT status be duly noted. Each landfill description is followed by a series of questions which remain to be answered before the study can be considered completed.

If the liner leaks, of course, leachate may escape from the bottom of a lined landfill and may cause pollution of nearby groundwater. Thus, in the mid-1970s, a new concept developed to protect groundwater -- the double-lined landfill. Two liners are placed in the ground, separated from each other by one to two feet of porous soil (sand, gravel, dirt). The lowest liner (the first one placed in the ground) is called the secondary liner. The upper liner (the one closest to the trash) is called the primary liner. The primary liner usually has a layer of porous soil (sand, gravel and dirt) put over it, to prevent trash and trash-moving vehicles from destroying the integrity of the liner. To increase the appeal of double-lined hazardous waste disposal landfills, they are sometimes called "scientific" landfills. A more common name is a "secure" landfill. A secure landfill typically employs a leachate collection system of the type described above. There is also, typically, a sump between the two liners. If liquids are detected in this sump, it is taken to be evidence that the primary (upper) liner is leaking. The secondary (lower) liner is still there to catch the leaking liquids, so no groundwater contamination is supposed to occur. A pump in the leak detector sump removes the leaking liquids, moving them to the same location as the leachate being pumped from the leachate sump.

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* Hypalon is a registered trade mark of E.I. du Pont de Nemours & Co., Inc.

In some secure landfill operations, a "tracer" chemical is added to the wastes. This is some element or compound, such as boron or fluoride or a dye, that does not normally occur in the wastes. The leak detector sump is tested for the presence of this "tracer" chemical. Its presence in the sump is persuasive evidence that the primary liner has failed.

This study examines four double-lined secure landfills in New Jersey to assess how the technology is working. New Jersey has five licensed "secure" landfills but the records of one were not available for inspection because the owner and the state are involved in litigation (over air pollution matters, not the landfill). Thus, this study reports on 80% of New Jersey's secure landfills. The study was carried out by careful reading of hundreds of reports and thousands of pieces of correspondence between the companies operating the landfills and the Solid Waste Administration (SWA), New Jersey Department of Environmental Protection. All of the data presented in this report were collected by the owners/operators of the landfills and reported to the regulatory agency. All the documentary evidence is available to the public at SWA offices, 32 Hanover St., Trenton, NJ.

This study contains three main sections. Part I assesses present-day performance of the four landfills. Part II discusses future performance. Part III offers recommendations.

PART I — PRESENT-DAY PERFORMANCE

MONSANTO INDUSTRIAL CHEMICALS COMPANY

The Monsanto Industrial Chemicals Co., of Logan Township, Gloucester County, applied to the N.J. Department of Environmental Protection (DEP) in 1977 for authorization to establish a new chemical landfill on their manufacturing site. "The landfill will provide an environmentally sound means of disposal for chemical solids and dry chemical sludges produced as a consequence of the manufacture of organic chemicals. Without this disposal site, manufacturing operations could not continue," the company's environmental impact statement said.[3]

The proposed six-acre site was originally a meadowland but had been used by the U.S. Army Corps of Engineers for deposit of materials dredged from the bed of the Delaware River.[4] In 1977 vegetation on the site consisted of dense reed grass and scattered willow thickets.[5]

According to the company's environmental impact statement describing the proposed facility, the site is "underlain by 120 to 200 feet or more of unconsolidated sands, clays and gravels."[6] The site is 150 feet from the edge of the Delaware River and 1000 feet from Birch Creek. Groundwater is found 4.5 to 14.5 feet below the surface. Surface waters drain off the site into the Delaware

River.[7]

The landfill was designed to accept 30 to 40 truckloads per week of chemical wastes, totaling 120,000 tons during the expected 5-year lifetime of the facility. Originally this 120,000 tons was to include 118,000 tons of waste type 12 (dry sewage sludge) and 2000 tons of waste type 18 (chemical waste - dry, non-hazardous). In a letter to DEP engineer Robert Patel, dated Nov. 7, 1977, Monsanto engineer Jeffrey Felder deleted 118,000 tons of waste type 12 (dry sewage sludge) and substituted 984,000 gallons (presumably weighing about 4,100 tons) of waste type 74 — liquid sewage sludge.

Originally Monsanto had proposed a landfill with a single liner. DEP officials persuaded company officials that a double liner with a leak detector system between the liners could provide greater protection for the environment. The company then proposed a primary liner of 12" of clay and a secondary liner of 30 mil (1/32 inch) Hypalon. Hypalon is a tough polymer film, in this case reinforced with nylon. The company later sought to substitute a layer of clay for the 30 mil (1/32 inch) Hypalon liner. The company argued that clay was superior because, among other things, "Twelve inches of clay is 400 times thicker than 30 mils of hypalon. It is therefore much less susceptible to mechanical breakage; [clay] stands up well to mechanical stress. Men and machines working on upper levels will not injure the lower clay liner; clay is self-healing. Therefore, mechanical damage will last for only short periods of time before being eliminated."[8] [Emphasis in the original.]

The company received permission from DEP to substitute a layer of clay for the Hypalon, but DEP required an increase in the thickness of the primary liner to 18". Thus, as built, the facility includes an 18" clay primary liner and a 12" clay secondary liner. In addition, below the secondary liner, a layer of special material called BIDIM* was placed in the ground to reduce the chance that uneven settling of the subsoil would destroy the integrity of a clay liner. BIDIM, a Monsanto product, is "a continuous filament polyester fiber needled to form a highly permeable fabric," says company sales literature. The product has been used to provide subsurface support for roadways, railway roadbeds and construction sites. The BIDIM used at the landfill was 90 mils thick (about 1/10 of an inch). The material is something like the felt pads that people sometimes use under rugs, except that it is lighter, stronger, and more durable, and liquid passes through it more easily.

The BIDIM liner was needed because information from boreholes indicated that the site soils were "quite soft and compressible and would be subject to consolidation under loading with landfilled wastes," said the DEP.[9] Under the weight of the waste material, the subsurface soils would be expected to compress. This is especially true at this particular site because the upper five to 20 feet of soil consist of dredge materials dumped by the Army Corps of Engineers. If these dredge spoils or the soils beneath them compressed unevenly, the landfill liners could develop cracks and then leak. The BIDIM liner is intended to prevent uneven settling beneath the landfill. To provide extra security, the soil beneath the BIDIM was mechanically compacted to 2700 pounds per square foot, to minimize the potential for future settling.

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* BIDIM is a registered trademark of Monsanto.

Despite misgivings by several government agencies,[10] the new landfill went into operation on August 17, 1978 [SWA registration No. 0809F]. Tables 1 and 2 describe Monsanto's wastes. For eight months the landfill operated as designed. Then in March, 1979, liquid was discovered flowing into the leak detector area between the primary and secondary liners. Analysis of the liquids revealed they were contaminated, offering evidence that the primary liner was leaking. Within a month, Monsanto officials wrote to Frank Coolick of the DEP Solid Waste Administration saying their landfill's primary liner was leaking: "The analysis of the manhole sample has confirmed contamination,...."[11] The company said there were two possible causes: (a) improper placement of the clay [liner] in the trench in which the monitoring manhole pipe was laid, or (b) a break in the clay caused by truck traffic in the solid waste area.

Since that time, more than two years ago, company officials have been trying unsuccessfully to locate the leak. During the most recent months for which data are available to me (Nov., 1979 - January, 1980), the leak-rate averaged 26 to 48 gallons per day. Monsanto hired consulting hydrologists Geraghty and Miller, who carried out a series of "rainfall tests". In these tests, water was sprayed onto sections of the landfill and then the monitoring manhole (in the leak detector sump) was observed, to see if flow rates increased. In two areas of the landfill, the rain test caused increased flow rates in the leak detector sump. These areas became prime suspects for leakage. Fluoride and boron tracers were added to the "rain" and new rain tests were run, to see if the tracers could be measured in the leak detector sump. The tracer tests revealed nothing and were termed "inconclusive". Increased water flow was noted in the monitoring manhole, indicating that the "rain" was making its way through the primary liner, but neither of the tracer elements could be measured in the leak detector monitoring manhole at significantly elevated levels.[12]

The question naturally arises, is there any evidence of leakage through the secondary liner and into groundwater. Monsanto asked its consultant, Geraghty & Miller, to evaluate this question. There are two distinct aquifers beneath the Monsanto site -- the near-surface "water table aquifer" and the deeper "artesian aquifer"; the aquifers are separated by a 30-to-50-foot-thick layer of "clay and sand" that the consultant terms an "aquiclude" (essentially impermeable layer). The consultant took samples from 24 wells at 12 locations around the site; at each location, one well taps the shallow aquifer and one the deep. The consultants did find a mound in the water table beneath the landfill but they said there is "reasonable evidence to conclude that the water-table mound in the vicinity of the landfill is related to factors other than leakage".[13] Analyses of shallow-aquifer samples for heavy metals and organic compounds presented an unclear picture: zinc, antimony, calcium and nickel concentrations increased with increasing distance from the landfill. On the other hand, "Analytic results for alkalinity, ammonia, chloride, iron, sodium and total dissolved solids (TDS) in the water table aquifer show constituent distributions with high concentrations near the landfill. When contoured, these distributions take on the appearance of a 'plume' of contamination.... However... [t]he data do not describe the pattern reasonably associated with leakage from this landfill."[14] In both the water table aquifer and the deeper artesian aquifer, TDS contours seem to center directly on the landfill. Contours for alkalinity, chloride, and sodium in the water table aquifer appear to implicate the landfill.[15]

The calculated flow-rate of groundwater beneath the landfill is 3 x 10^{-2} ft/day. When the study was done, the landfill was only two years old, so contamination should have traveled only 22 ft; yet it was being found hundreds of feet from the site, thus implicating other sources besides the landfill.

Geraghty & Miller concluded, "There is no firm evidence that the landfill has leaked [into groundwater]."[16] However, an April 10, 1981, memo from Scott Andres in DEP's Division of Water Resources concludes, "In the writer's opinion, the data presented does not justify these sweeping statements regarding this [land]fill."[17] DEP has initiated a broad-scale evaluation of groundwater contamination associated with the entire Monsanto production facility. The company has asked permission to expand the capacity of its secure landfill but the DEP has denied the request.[18] At the present time, the primary liner of the Monsanto secure landfill continues to leak.

QUESTIONS REMAINING TO BE ANSWERED ABOUT THE MONSANTO LANDFILL

Q1: It is unclear what wastes are being introduced into the Monsanto landfill at present; the Solid Waste Administration does not appear to have records which describe the waste quantities or characteristics. In 1979 George Tyler of DEP revoked permission for Monsanto to place phthalate esters in this landfill, but the Bureau of Hazardous Waste in DEP has no records in the Facility 0809F file indicating whether placement of those wastes ceased and, if it did, where those wasteS are now being placed.

Q2: What time of year did the compaction of the soil occur during construction of the site?

Q3: What is the thickness of the "leak detector area" between the primary and secondary liners and what kind of material was placed there during construction?

Q4: In Table 2 is the cadmium value really 0.15 mg/l?

E.I. DU PONT DE NEMOURS & CO., INC.

E.I. du Pont de Nemours & Co., of Deepwater, New Jersey, formally applied to the NJ Department of Environmental Protection (DEP) in April, 1978, seeking authorization to expand an existing landfill in Carneys Point Township, Salem County. The existing site was 5 acres and DuPont sought to add two contiguous 5-acre sites.[19]

DuPont's application to DEP listed the kinds of wastes to be put into the new 10-acre landfill: "The wastes will include 'dry' primary sludge from the Chambers Works/Carneys Point Works Waste Water Treatment Plant, a variety of drummed solid chemical wastes from DuPont plants in this region and bulk solid chemical wastes associated with Chambers Works operations."[20] A series of tables in the original application described the wastes in more detail; see Tables 3 through 6.

Some time prior to April, 1978, DuPont had applied to DEP for authorization to expand their existing 5-acre landfill. That application had been denied; the application was deemed "incomplete" because of deficiencies noted by DEP engineer Thomas Sherman in a memo to the file:

> The leachate analyses show that the pollutant levels are rather high. Furthermore, there is no assurance that the impervious liner under the existing landfill [Facility 1713C] does not and will not leak in the future.
>
> The analyses of leachates from the existing fill area may not even be relevant for predicting leachates from the expansion, since, the existing landfill did not accept chemical wastes disposed in bulk and waste oil and sludge, but only chemical waste in drums. Also, because the existing landfill

> has been accepting drummed chemicals for less than two years, these drums may not as yet have significantly deteriorated to reveal the ultimate effect of their contents on the leachate quality.
>
> In addition, the site topography and boring data do not lend themselves to a clear inference of the direction of groundwater movement at this site. Lacking a firm indication of this movement, it becomes difficult to determine the impact, if any, of the landfill itself on any changes in groundwater quality which may be detected through the monitoring wells. However, the materials proposed for disposal in the expansion of this facility and the leachates they will generate would pose serious environmental threats to the ground and surface waters of the state if they escaped from the landfill.
>
> The environmental impact statement does not state what would be done, if anything, to correct the situation if it were determined at some future time that the liner was not preventing the percolation of the leachate into the ground water. The impact statement does not address the situation of the groundwater in the vicinity of the existing landfill being already polluted, or the possibility of the existing landfill causing or aggravating this present polluted state. The impact statement does not address the question of what quality or change in quality of the groundwater would, in fact, constitute an adverse impact. The impact statement also does not address the question of possible cumulative and long-term impacts of the proposed action which would either significantly reduce or enhance the state of the environment for future generations.....
>
> We feel that no liner material has been satisfactorily demonstrated to endure faultlessly in long-term (50 or more years) use. Since landfilling is intended to be an ultimate disposal, and since many of the hazardous components of the chemical wastes and sludges proposed for disposal at this facility are neither decomposable or naturally detoxifiable, we insist that the engineering designs for such a facility provide for the continuous monitoring of the primary liner itself.... We feel that there is no doubt about the serious pollutional potentials of the leachates producable [sic] from these chemical wastes and sludges....[21]

When the formal application was filed with DEP in April, 1978, it provided two liners with two leak-detector sumps between the liners, plus monitoring wells outside the secondary liner to provide evidence that the secondary liner has or has not failed.

Beatrice S. Tylutki, then director of the Solid Waste

Administration, on Jan. 8, 1979, signed a Certificate of Approved Registration and Engineering Design Approval, providing that the primary and secondary liners would consist of 30-mil nylon-reinforced Hypalon. The Certificate specified that 12 shallow and three deep groundwater monitoring wells had to be sampled for the following materials: titanium, chromium, copper, lead, iron, zinc, chemical oxygen demand (COD), phenolics, surfactants, total dissolved solids (TDS), color, 1,1,1-trichloroethylene [sic; probably what is intended is 1,1,1-trichloroethane — P.M.], chlorobenzene, chloronitrobenzene, dichlorobenzene, and trichlorobenzene. [The last three names represent groups of chemicals, not individual compounds. -- P.M.]

DuPont signed the Certificate on Jan. 12, 1979, and began placing sludge into the landfill on Jan. 15. On March 21 George Cassedy, Superintendent of DuPont's Environmental Control Division, wrote to DEP engineer Thomas Sherman, saying "....We are informing you of the presence of liquid in the leak detector system...."[22] Deputy Director of the Solid Waste Administration, Henry A. Jatczak, on April 5 ordered DuPont to stop putting drummed wastes into the landfill and to keep daily records of pumpage of liquids out of the leak detector system. This order continued in effect for three months, until July 3, 1979. On June 26, 1979, Dupont's General Superintendent of the Environmental and Services Department, T.E. Lewis, wrote to Walter Burshtin and L.F. Pereira of DEP saying,

> Our initial landfill [1713C] is now full and we are in urgent need of disposing of drummed wastes in the subject expansion [1713F]. We have no other established or authorized means of disposing of these materials. As we have discussed

> previously, our plant production is dependent on the safe and satisfactory disposal of these materials.
>
> We request that the restriction be removed and disposal of drummed wastes, as identified in our permit for Secure Landfill 1713F, be reauthorized.

Mr. Lewis gave three reasons why the ban on drummed wastes should be lifted: (a) the drummed wastes are "not highly toxic.... most are relatively insoluble polymers or tars"; (b) these materials are already in the primary sludge going into the landfill; (c) leachate and leak detector data do not correlate and there has not been any upward trend "in the low level of parameter concentrations present in the leak detector".

Mr. Lewis went on to explain that his company did not believe any liners in their landfill were actually leaking. Instead,

> In about July, 1978 a load of primary sludge was placed too near the eastern side of the original landfill section, spilling sludge down the slope. Before this sludge was removed, it rained and some leachate may have washed down the slope into the construction area of the new section carrying contaminants into it.
>
> ...The metals contained in 100-200 pounds of sludge would be sufficient to account for the concentration of contaminants detected between the liners in the water found to be present. It has been shown that available water from the rainfall during liner installation could account for the amount of water now present. There is no evidence that any significant additional volume of water entered through the liner from standing water on the landfill after liner completion....[23]

Beatrice Tylutki wrote John R. Potts of DuPont July 3, 1979, giving DuPont a "temporary variance" allowing them to continue burying drummed wastes in the "C" landfill (1713F) until Sept. 4, 1979. In that letter Ms. Tulytki ordered DuPont officials to name a "tracer element" by August 3, 1979; the tracer would be mixed with the wastes being put into the landfill. Presence of the tracer in the leak detector would be direct evidence of liner failure. Conversely, absence of the "tracer element" in the leak detector system would provide evidence that no liner failure had occurred.[24]

George Cassedy of DuPont responded Aug. 2, 1979, to Beatrice Tylutki: "We feel that leachate itself is the most practical tracer for our use.... After one and a half years, the concentration of four parameters — TDS [total dissolved solids], phenolics, color and COD [chemical oxygen demand] — in the leachate will be 5-50 times that present in the leak detectors." Mr. Cassedy referred Ms. Tylutki to two tables he attached; see tables 7 and 8. "Thus in effect there are four tracers in the leachate," Mr. Cassedy said.[25]

On Aug. 31, 1979, Lino F. Pereira, who had recently replaced Beatrice Tylutki as director of the Solid Waste Administration, wrote George Cassedy of DuPont extending the temporary variance permitting the dumping of drummed waste. He also gave DuPont permission to use TDS, color, phenolics and COD as tracers in lieu of the addition of an alien substance. He explained that concentrations of the four tracers measured to date would be taken as background levels "and any increase in the concentrations measured for these parameters in the liquids found in these sumps in the future that the [Solid Waste] Administration considers to be significant shall be interpreted as evidence of leakage from the primary liner."[26]

Dec. 6, 1979, George Tyler, then director of the DEP's Division of Environmental Quality, wrote George H. Cassedy of DuPont, permanently lifting the restriction on dumping of drummed wastes.

The DuPont landfill was free to operate as originally licensed.

DuPont pumps the two leak detectors daily and records the amount pumped. Twice a month they analyze a sample of the water pumped from each leak detector. In April, 1979, the average total pumped from the two leak detectors was 124 gallons per day. That amount decreased steadily until February, 1980, when it leveled off at about 50 gallons per day, where it has remained ever since.

I have analyzed the available data on the four tracers which are supposed to be used to indicate whether the pumped water represents rainwater trapped between the liners during construction or whether it represents leachate entering the leak detectors through a failed upper liner.

Appendix A presents a compilation of the data on the four tracers sent to DEP by DuPont officials. The "background" set of data comprises 16 measurements of each of four parameters in each of two leak detectors. These are data gathered between February 22, 1979, and August 31, 1979. The "new" data comprises 38 measurements of each of four parameters in each of two leak detectors. These are data gathered between September 10, 1979, and March 23, 1981. In Appendix A, a value entered as "999.0" represents the absence of reported data and is omitted from all computations.

A two-sample t-test and a Mann-Whitney U-test were applied to the data; these were one-tailed tests conducted at the .95 level of significance.[27] Table 9 presents the results.

It is clear from Table 9 that, for 7 of the 8 available measures, the t-tests indicate leakage is occurring in the primary liner. Only chemical oxygen demand in Leak Detector 1 does not reveal a significant difference. (See the note accompanying Table 9.)

Results of the U-tests are presented in Table 10.[28] These U-tests reveal, as the t-tests did, that 7 of the 8 available measures indicate that leakage is occurring in the primary liner of the DuPont "C" landfill in Carneys Point. (See the note accompanying Table 10.)

Thus by the criteria suggested by the company and accepted by the regulatory agency, the primary liner of the DuPont Carneys Point secure landfill must be deemed to be leaking.[29]

QUESTIONS REMAINING TO BE ANSWERED
ABOUT THE DUPONT SECURE LANDFILL

Q5: Several matters mentioned in Mr. Sherman's memo of 12/21/77 seem never to have been answered. What are the answers?

Q6: The DEP files on this site do not contain any information about site geology, or hydrology, nor about surface ecology. Can this information be supplied by the DEP or by the company?

Q7: Where are the groundwater monitoring data associated with this site? They do not appear to be with the "General" or "Engineering" files in the Bureau of Hazardous Waste.

Q8: In Table 4 are the units for alkalinity correct?

Q9: In Table 5 is tetraphthaloyl chloride correct?

Q10: In Table 5 "Pontamine sludge" and "Sevron sludge" are shown having the same composition. Is this correct?

J.T. BAKER CHEMICAL CO.

J.T. Baker Chemical Co., of Phillipsburg, NJ, in 1977 asked permission of the New Jersey Department of Environmental Protection (DEP) to expand an existing landfill in Harmony Township, Warren County.

The firm had been using the site (called Brainards Landfill) for 20 years. The site covers 22.3 acres, of which 17 had been used, or were being used, in 1977.[30]

The company proposed to create four new pits in the ground and line them with two layers of 30-mil PVC [polyvinyl chloride], with a foot of sand between them. At a low place in each pit, a vertical pipe would serve as a leak detector. Any liquids flowing between the two plastic liners would collect in the low places and be visible in the pipe.

The site is "[g]ently rolling farmland and hills are present in the landfill area.... The landfill site slopes gently toward the Delaware River on a 20-foot horizontal to 1-foot vertical slope.... Grass and small brush cover the area, while trees, less than 12 inches in diameter, line the perimeter."[31]

Geologically the site is described as follows: the upper 10 to 12 feet is "silty sand"; the next deepest 25 feet is "glacial till (boulders and cobble)"; below that is "dolomite (with seams and voids)".[32] A report on site geology, prepared for the company, says "The major feature of the bedrock [the dolomite] is the occurrence of voids and seams. These range from a few inches to four feet. Some are infilled with brown silty sand and others appear to be open. The bedrock surface and a few fracture surfaces at depth show irregular solution patterns. It appears that groundwater passes through a system of channels dissolved in the bedrock."[33]

The report goes on to mention that groundwater is located about 55 feet below the surface.

The "Certificate of Approved Registration and Engineering Design Approval" was signed Aug. 17, 1978, but it wasn't until the summer of 1979 that construction was completed.

In mid-June, 1979, the first problems became apparent. Rain was washing sand off the side walls of one of the pits, exposing the PVC primary liner to sunlight. The ultraviolet component of sunlight degrades PVC, thus threatening the integrity of the liner. The company solved this problem by spray painting large areas of the liner with a special compound that absorbs ultraviolet light.

In the fall of 1979 other serious problems became apparent. George Tyler, director of the Division of Environmental Quality, DEP, wrote to Robert M. Blanchfield of J.T. Baker Nov. 30 as follows:

> In response to the discovery of liquids in the leak detector riser pipes of all four (4) double-lined pits at the rerenced landfill [facility 2110B] as witnessed by representatives of the Solid Waste Administration on October 4, 1979, the Department has become very concerned about the source of these liquids. Since it is unknown whether the sources of these liquids are the failures of the upper liners, the result of liquids entrapped during construction, or some other sources, you are hereby ordered to take the following interim measures:

Mr. Tyler then ordered J.T. Baker to cease using pit No. 20, to test each leak detector pipe for the presence of fluids every day and keep appropriate records, and to make weekly analyses of samples of the fluids to see if they contained any of 16 chemical elements or compounds.

On Dec. 21 the company responded to Mr. Tyler saying, in part,

> Our interim assessment is that the amount of liquid present in the leak detector system is not unusual or excessive, that no real problems exists [sic], and therefore, that no corrective measures need be taken....
>
> We know that a significant amount of water became trapped between the liners when it rained after the installation of the first liner but before the second liner was installed. We feel very confident the water in the LDS [leak detector system] is actually the trapped rainwater and not an indication of a leak in the top liner.[34]

The observed leak rate averages 2.5 to 3.5 gallons per day, according to DEP engineer Thomas Sherman.[35]

How does one determine whether the water in the leak detector systems is leakage or is simply rainwater that entered the system during construction (after the secondary liner was installed but before the primary liner was installed)?

None of the correspondence between SWA and J.T. Baker Chemical Co. discusses this problem. However, as indicated in the discussion (above) of the DuPont landfill, DEP agreed with DuPont that the best way to approach this problem is to take continuing samples of liquid from the leak detector system, call the early samples "background" and compare the later samples to the earlier samples. If the "later" samples contain more contaminants than the "background" samples, conclude that a leak is occurring in a primary liner.

As with the DuPont example, appropriate statistical tests are the two-sample t-test (for two independent means) and the normal approximation to the Mann-Whitney U-test. Appendix B presents all of the data used in these tests. In Appendix B, any value recorded as "999.0" represents the absence of reported data and is omitted from all calculations. All tests were one-tailed, conducted at the .95 level of significance. Tests were conducted on arsenic, magnesium, thiocyanate, TDS [total dissolved solids], TOC [total organic carbon], and potassium data from pits 17 and 18 reported to DEP by the company. These measures were selected somewhat arbitrarily. Benzene, toluene and trichloroethylene were specifically not selected because a letter from Robert M. Blanchfield of J.T. Baker to DEP engineer Thomas Sherman, dated Nov. 19, 1980, says the company believes that "interferences" resulted in erroneous measurements for these compounds. Thiocyanate and potassium were selected for study because letters from Mr. Blanchfield of J.T. Baker to DEP officials indicated that Mr. Blanchfield considered these significant tracers.[36] [A chemist colleague of mine considers them rather poor tracers because the potassium will be sorbed by clay particles and the thiocyanate will react with other constituents of the system. Thus potassium and thiocyanate would be attenuated as they moved toward the leak detector area.[37]]

DEP's files on pit 19 do not contain any data more recent than Aug. 4, 1980, so this pit was ignored. (According to DEP engineer Thomas Sherman, J.T. Baker ceased using this pit, thus explaining the absence of recent data.) For pits 17 and 18, sixty measures were available for each pit. To approximate the tests agreed to by

DuPont and DEP (see earlier discussion), I designated the first third of the data (from December 12, 1979, through May 21, 1979) "background" and the most recent two-thirds of the data (from May 27, 1979, through March 23, 1981) "new" data.[38] Table 12 presents the relevant mean values and t statistics. As Table 12 shows, for pit 17, five of the six measures indicate a significant increase. For pit 18, three of the six measures show a significant increase.

Table 13 presents normal approximations to the Mann-Whitney U statistic. These statistics confirm what the t-tests revealed. In pit 17, five of the six measures reveal significant differences; in pit 18, four of the six measures reveal significant differences.

It seems reasonable to conclude that the primary liner of pit 18 is quite possibly leaking; further analysis is warranted. It also seems reasonable to conclude that the primary liner of J.T. Baker's pit 17 is leaking.

QUESTIONS REMAINING TO BE ANSWERED
ABOUT THE J.T. BAKER SECURE LANDFILL

Q11: What is the detailed chemical composition of J.T. Baker's wastes? DEP records do not appear to contain this information.

Q12: A letter from L.C. Hui of SWA to A.R. Majmuder of J.T. Baker, dated 1/4/78, asks for evidence that J.T. Baker's wastes will not degrade a PVC liner. DEP files do not appear to contain a response to this request; what was the response?

Q13: The company's "Operating Procedures Manual" describes various options to be pursued when a leak is discovered; continued operation is not one of the options. The DEP's Certificate of Registration cites the options in the "Operating Procedures Manual". Why is (are) the leaking pit(s) still operating?

Q14: A letter from Mr. Blanchfield of J.T. Baker to Lino Pereira of SWA, dated 12/2/80, says the company miscalculated the capacity of the new pits and is in urgent need of opening still newer pits. What is the status of these newer pits today?

Q15: Where are the groundwater monitoring data from the five wells surrounding this facility? Given that the geology of the area is fractured, are these wells adequate to monitor this facility?

Q16: In Table 11, why are units of mg/l given instead of mg/kg?

TOMS RIVER CHEMICAL CORPORATION

The Toms River Chemical Corp. applied to the New Jersey Department of Environmental Protection (DEP) in 1976 for authorization to create a secure landfill in Dover Township (Ocean County). TRC employs 1400 people manufacturing organic dyestuffs, epoxy resins, pigments, and fine chemicals for the textile, paper, and plastics trades.[39]

On January 3, 1977, Beatrice S. Tylutki, then director of the Solid Waste Administration, wrote TRC offering them authorization to operate a double-lined secure chemical landfill for one year. Ms. Tylutki said, "You will note that the authorization is for one year and requires use of a double liner. These and other conditions reflect our concern regarding the appropriateness of this site for landfill activities."[40]

This landfill [Facility 1507C] was finally fully registered Oct. 11, 1977. The Certificate of Registration calls for two liners. The bottom (secondary) liner is 20 mil (1/50 inch) PVC; the upper (primary) liner is 30 mil (about 1/32 inch) PVC. Between the two liners is 6" of sand and 1' of gravel. Pipes in this area constitute the "leak detector" sump.

The Certificate of Registration requires TRC to add a lithium tracer to its wastes. Lithium is not ordinarily found in TRC's wastes. If lithium should be found in the leak detector area between the two liners, it would be strong evidence of liner leakage.

TRC landfills only solid wastes from in-house manufacturing processes. The waste can be described in three categories: epoxy resin residues, clarification residues, and distillation residues.

Epoxy resin residues are by-products of the clarification of insoluble epoxy resins. They contain resins, resin by-products, filter paper and cartridges, clay and diatomaceous earth. This waste is drummed. See Table 14.

Clarification residues are solid sludges or cakes from the clarification of dyes and pigments. They contain insoluble dyes, pigments, iron oxides, clay, lime grit, and filter aids. Some are drummed, others are transported in bulk. See Table 15.

Distillation residues are solid residues remaining after the distillation of solvents used in the manufacture of insoluble dyes and pigments. They contain gypsum and residues of dyes and pigments. They are drummed. See Table 16.

TRC began interring wastes in the double-lined landfill Dec. 19, 1977.[41] Five months later, TRC applied to DEP for permission to expand its landfill. The plan was to construct seven additional double-lined cells, all identical to the first with the exception that both liners in each cell would be 30 mil PVC.[42] Each cell would cover approximately 2 acres; each cell would be filled in 1.5 to 2 years, giving a total lifetime of 12 to 16 years for the expanded facility.[43] In applying for permission to expand its landfill, TRC said, "This proposed landfill is the only feasible and environmentally sound way to dispose of the solids generated during wastewater treatment. Moreover, failure to construct the landfill could result in the shut-down of operations at the TRC plant."[44]

The plan called for interment of about 7,000 drums per year of epoxy resin residues, clarification residues, and distillation residues (see Tables 14-16). In addition to the drummed wastes, about 26,000 cubic yards (26,325 tons) of filter cake would be interred in bulk (i.e., not drummed). Filter cake is the semi-solid sludge produced by the company's wastewater treatment plant.[45]

TRC's facility is located on the western edge of Dover Township, about 3 miles northwest of downtown Toms River. The main branch of the Toms River forms a small portion of the eastern boundary of TRC's site. The expanded landfill site is roughly 1300 feet from the edge of the river. [46]

Three geologic formations underlie the TRC site: Cohansey sand, the Pennsauken Formation, and the Cape May Formation. The Pennsauken Formation is "chiefly sand, slightly glauconitic, and contains abundant ironstone fragments. The Cape May Formation is also chiefly sand but is less compact....All three formations comprise the water table aquifer in this area. The sandy deposits are roughly 80' to 100' deep and are underlain by a relatively thick clay layer....The groundwater tends to move in an easterly direction eventually discharging into the Toms River."[47] "....[T]he permeabilities of the soils in the area range from moderate to rapid."[48] Average rainfall in the area is 50.8" per year.[49]

The environmental impact statement that describes the proposed landfill expansion also discusses potential problems:

> The major potential hazard from the proposed project is the failure of the liner system to contain the leachate. Improper installation or sealing of the liners represents a potential hazard, as does the possibility of liner degradation and breakdown after the landfill has been closed. Animals, persons, or earthquakes could also damage the underliners or top cover. These membranes must remain intact indefinitely. As a precaution, TRC would fence the landfill area to keep out intruders. In the event of failure of the top cover, plus both of the underliners, the leachate would percolate down and intercept the water table....[T]he introduction of these contaminants into the groundwater would degrade these waters somewhat. The Toms River would eventually receive these waters and the ecology of these waters could be upset as a result.[50]

In accordance with law, the DEP convened a public hearing in Toms River to permit local citizens to ask questions and speak their mind about the proposed landfill. Marjorie Rosenblum, a citizen of Lakehurst, asked how long the PVC liners could be expected to last. She said,

> I have been reading about the chemical wastes and I am wondering how long — what is the life span of the containers and the plastic coverings, both the bottom covering and the outer covering and has there been any past experience with this type of landfill?[51]

By way of response, the DEP lawyer conducting the hearing (Mr. Mark McQuerrey) handed the question to William Bobsein, TRC's manager of environmental technology, saying, "Does the specification for the liners you're using give any indication as to what the expected life would be under the conditions that are to be placed?" [Sic; one suspects that the stenotypist failed to make an entirely accurate record of this hearing.]

Mr. Bobsein did not answer. Neither did Vincent Wroniewicz, the chief engineer (employed by Catalytic, Inc., of Philadelphia) who oversaw the specification and installation of the liners.

Thomas Concannon of the Environmental Assessment Council, Inc., who wrote the environmental impact statement on the proposed facility, answered as follows: "The specifications indicate that the liners are not reactive. The chemicals that would be placed in there would not react with them. In other words, they would not be corroded in any way by those chemicals and I feel that the lifespan of it is indefinite."[52] Neither Mr. Bobsein nor Mr. Wroniewicz contradicted Mr. Concannon.

On January 19, 1979, DEP issued a "Certificate of Approved Registration and Engineering Design Approval" for the proposed 8-cell expansion of TRC's double-lined landfill. In February, 1979, TRC began dumping chemical wastes into cell two, the first expansion cell. The old single-cell facility [1507C] thenceforth became known as multi-cell Facility 1507D.

On April 3, 1979, DEP officials visited TRC and in the course of their visit asked to see the leak detector sumps of cells one and two. They discovered four feet of liquids standing in the leak detectors. TRC officials said this was the first time they had noticed any liquids standing in the leak detectors

DEP officials returned to Trenton and three weeks later wrote TRC a letter demanding that they (a) pump all liquids out of the leak detector area daily; (b) analyze samples from the leak detectors; and (c) within 30 days develop an action plan for defining the problem and taking remedial action.

Before DEP had sent its letter, TRC had already completed at least one chemical analysis which they mailed to DEP April 24.[53] It showed 40 parts per billion (ppb) of the tracer element, lithium, in the leak detector liquids of cell one. At the public hearing, Vincent Wroniewicz, the engineer representing Catalytic, Inc. (the Philadelphia firm that designed and constructed cell one and designed cells 2-8) had described the purpose of putting lithium salts into the wastes being interred: "As a positive check, easily detectable, non-hazardous tracer salts [lithium] will be added in the landfill. Routine analysis for these tracers will quickly detect any liner leakage."[54]

In transmitting the finding of lithium to DEP, J. Winkler, Technical Director for TRC, wrote, "We believe that the analyses of water from the leak detector manhole do not appear to indicate leakage in the upper two of the landfill liners."[55] He said that the leak detector manhole cover was permitting water to enter the leak detector area from above.

Two analyses in May, 1979, indicated low levels (30 ppb) of lithium in the leak detector area of cell two.[56]. Six analyses during April and May, 1979, showed low levels (20 to 140 ppb) of lithium salts in the leak detector area of cell one. In reporting these results, J. Winkler, TRC's technical director, termed the findings "no[t] significant". "Personally I am still convinced that at present our landfill is the best one in operation in the State of New Jersey," he said.[57]

On May 18 Beatrice Tylutki wrote to TRC officials forbidding them from putting any more wastes into cell two.

The volume of the leak in cell two was reported by William

Bobsein, Manager of Environmental Technology for TRC, to have averaged somewhere between 60 and 131 gallons per day (gpd) through August 22, 1979. A flow meter installed in the sump showed 131 gpd; catching liquids in a graduated cylinder and timing the catch with a stop watch showed 60 gpd. The company said they considered the cylinder-and-stopwatch method much more accurate than the flow meter. In mid-September, 1979, Mr. Bobsein wrote DEP's Frank Coolick, saying TRC had found and repaired a small hole in the primary liner of cell two and had reduced the leak rate to 60 gallons per day. "At this point we do not know how we can further reduce this flow," he said.[58]

The leak in cell one was reported as 3 to 4 gallons per day. Analyses in May, June, July, August, September, October, November, and December, 1979, showed lithium salts (20 to 80 ppb) in cell one's leak detector.[59]

On May 22, 1980, Lino Pereira, director of the Solid Waste Administration, sent TRC an Administrative Order, amending TRC's approved registration for Facility 1507D. The Administrative Order reviewed the history of events up to May, 1980, concluding as follows:

> The SWA [Solid Waste Administration] has reviewed the data on the analyses and volumes of liquids pumped from the primary leachate sumps and the leak detection sumps of both cells 1 and 2 of the subject facility, and has concluded that the data indicates leakage of liquid through the primary liners of the two cells.
>
> The SWA also maintains that the intention of the approved engineering design was to prevent, not minimize, any such leakages, and therefore the SWA has concluded that the two landfill cells constructed at the subject facility are not performing in accordance with the intention of the approved engineering design.[60]

The Administrative order went on to revoke TRC's authorization to construct any cells beyond cell two; and to revoke TRC's authorization to place drummed wastes into cell one after July 1, 1980, and bulk wastes into cell one after July 1, 1981. The order was signed by George Tyler, then director of DEP's Division of Environmental Quality.

June 11, 1980, a law firm representing TRC responded to DEP, saying the Administrative Order was an unconstitutional, unwarranted and illegal infringement of TRC's rights. "For example, the Administrative Order contains several statements that the engineering design was planned and intended so that there would be zero seepage through the primary liner of the system. TRC contends that these statements are inaccurate because there was never any intention, representation or obligation that there would be zero seepage arter the primary liner had been installed in the field," the lawyers wrote.[61] The statement want on to say that "a zero seepage primary liner system" is "beyond the current state-of-the-art."[62]

The lawyers went on to argue that complying with the Administrative Order would require TRC to ship its wastes off-site at an annual cost of $7 million. This would break the company, they said.

DEP did not require compliance with the Administrative Order. A series of negotiations between the company and the agency began. Throughout the summer of 1980 company and agency officials met, trying to reach agreement on the issue of the double liner system.

Could it be expected to achieve 100% containment? The agency said yes and the company said no. By October negotiations had broken down and the agency issued a new Administrative Order. The Order required TRC to (among other things)

> Engineer the redesign of Cell Two to provide for a dual bottom liner system which shall utilize materials for both the upper and lower liners that will retain their complete integrity for the entire period of time that wastes are intended to be contained within this Cell. Each liner shall be certified by a New Jersey licensed Professional Engineer to be impermeable to the passage of leachate and other liquids immediately prior to the commencement of waste disposal in Cell Two.

In addition, the October, 1980, Administrative Order revoked TRC's authorization to construct any cells beyond number two, and it further revoked TRC's authorization to dispose of any and all wastes beyond July 1, 1981.

Again TRC's attorneys wrote a strongly-worded defense. They said the Administrative Order violated their client's statutory and constitutional rights. They said their client would "be forced to shut down completely" by the Order.[63]

Perhaps more importantly, lawyers for TRC said,

> The observed water flow rates between the liners of Cell No. 1 and Cell No. 2 are within the limits established by the DEP in its definition of an 'impermeable liner' contained in the proposed Hazardous Waste Management Regulations, N.J.A.C. [New Jersey Administrative Code] 7:26-1.4."

The New Jersey Administrative Code, Title 7, Section 26, Subsection 1.4, defines impermeable as follows:

> Impermeable liner means a layer of natural and/or man-made material of sufficient thickness, density and composition so as to have a maximum permeability for water of 10^{+7} cm/sec at the maximum anticipated hydrostatic pressure.[64]

Obviously there is a misprint in the version of NJAC that I consulted. It should be 10^{-7} cm/sec, not 10^{+7} cm/sec. Assuming that TRC's lawyers and engineers were not relying on this misprint to make their case, they seem to be claiming that a leak of 60 gallons per day through a PVC liner does not constitute violation of the 10^{-7} cm/sec permeability requirement.

The state is clearly claiming that a 60 gallon per day leak violates the permeability requirement.

This argument points up the difficulty of enforcing the 10^{-7} cm/sec permeability standard. Taken at face value, one can argue that, if water passes through a surface of one square centimeter at the rate of 10^{-7} cm/sec, during one day (86,400 seconds), a total volume of 8.64×10^{-3} cc will have passed through. There are 929.03 square centimeters in a square foot, so 8.03 cc (or 0.0020870 gallons) will pass through an area of one square foot each day.

This would permit 90.9 gallons per day to pass through an area of one acre (43560 sq. ft.). However, the real world is not so simple as this calculation would make it appear. If one has a landfill liner covering the floor and sides of a pit, does one count the sides in the calculated area of the landfill? If one is not placing wastes on the entire floor area of the landfill, does one calculate the entire floor area or just the area being used for waste disposal at the time of the calculation?

Further difficulties: The 10^{-7} cm/sec standard was originally developed for soils. As liquid moves downward one vertical centimeter through an area of soil measuring one square centimeter, the resulting liquid volume in the soil is not one cubic centimeter. The liquid only fills the void space in the soil. The void space will vary from soil to soil. When one calculates the permeability of a leaking plastic liner, there is no soil involved at all (at least in the theoretical calculation) and so the entire space is void space. Omitting the concept of soil void space from the calculation will permit much greater leakage than would be permitted if the calculated [illegible] were considered to be partially (perhaps 2/3 to 4/5) filled by soil particles.

Lastly, the 10^{-7} cm/sec permeability standard is established assuming that flow through all parts of the liner will be the same. Obviously in the case of a leak, some parts of the liner are transmitting fluids much faster than some other parts. Ninety-one gallons of pollutants flowing uniformly from the entire bottom surface of a one-acre site represent a substantially different pollution potential than do 91 gallons of liquid flowing through a single small hole in a liner. In the latter case, the 91 gallons is concentrated in one area; in the former case the 91 gallons is distributed over an entire acre.

It is not at all clear how the 10^{-7} cm/sec permeability standard can be used to protect groundwater beneath a leaking landfill.

More negotiations ensued. On March 12, 1981, DEP's Jack Stanton signed an Administrative Consent Order which spelled out an agreement that TRC and DEP had reached. In the following discussion of the Consent Order, my personal comments are enclosed inside square brackets. The Consent Order says:

(a) TRC will close cell one "so as to prevent the entry of any liquids into the interior of the cell". [The original certificate of registration of Jan. 19, 1979, had required this, so this represents no new conditions imposed on TRC.]

(b) An "impervious liner" will be placed over cell one at time of closure. [Note that the term "impervious liner" has been substituted for the legally defined term "impermeable liner". My dictionary[65] says impervious means "not allowing entrance or passage through; impenetrable". Use of this term perhaps avoids the difficulties of applying the legal definition of "impermeable" to a leaking liner. Any fluids passing through an "impervious" liner should be sufficient to demonstrate that such a liner is not impervious. However, the term "impervious" (and not the legally defined "impermeable") was the word used in the original Certificate of Registration for these TRC facilities; in addition, Thomas Sherman of the Solid Waste Administration is of the opinion that the DEP was not intending to make any distinction between "impervious" and "impermeable".]

TRC must develop a closure plan for cell one, which plan must include details of a road to be placed across part of the surface of the closed facility, "...suitable for a dump truck access needed to place waste in Cell Two on the northern top edge of Cell One."

(c) TRC must give timely notice (at least 15 days) to DEP of their detailed plans for closing cell one.

(d) DEP has the right to inspect the closure of cell one. Furthermore,

> the DEP reserves all its rights regarding appropriate remedial measures should sampling of the leak detection sumps for Cells One and/or Two disclose either quantities or quality of liquid accumulation deemed by the Department to be indicative of unsatisfactory liner performance.

[The agreement contains no indication of what the DEP might consider "unsatisfactory performance." In May, 1980, and October, 1980, in two Administrative Orders, the DEP had clearly indicated that leaks of 4 gallons per day through the primary liner of cell one and 60 gallons per day through the primary liner of cell two constituted unsatisfactory performance. In March, 1981, the DEP was evidently deeming such liner performance satisfactory, without making it clear why the official view had changed.]

(e) If TRC wants to apply to DEP for permission to use cells 3-8, their application will have to conform to all state and federal laws. [This seems to indicate, without saying so directly, that TRC's authorization to construct and operate cells 3-8 has, in fact, been revoked and that they'll have to re-apply to DEP before proceeding further.]

(f) TRC's use of cell two "is contingent upon TRC's submission of the final water quality study of the groundwater flowing through the soils below its plant premises as proposed by Geonics, Inc.... After completion of the herein-described water quality report, TRC will develop recommendations within 45 days for remedial steps which may be implemented to remedy the existing on-site groundwater contamination and to prevent its migration off-site, and submit same to the Department within 30 days after their development by TRC."

[As it is worded, this stipulation requires TRC to complete a "final" water study before operating cell two. Beyond completion of this "final" study, no further action seems to be required of TRC before full operation of cell two becomes legal. There are three water studies in DEP's files by Geonics, Inc. None of them is marked "final report". Thus there is no evidence in DEP files (as of 7/1/81) that TRC has complied with this section. Implementation of the remedial groundwater cleanup program appears to be optional because the next paragraph says:]

"At its discretion, the Department may enter upon the TRC premises to observe the manner in which this environmental evaluation and/or remedial program, _if undertaken_, is being performed...." [My emphasis. Thus DEP is now in a position to learn something (unspecified) about water quality beneath the TRC site. They are evidently not, however, in a position to require TRC to take any actions to mitigate pollution.]

(g) Should TRC violate the Consent Order, DEP has the right to take "whatever action it deems appropriate to obtain full compliance with the regulatory and statutory requirements for disposal of chemical wastes." [This imposes no new restrictions on TRC, nor does it give to DEP any rights or powers that the agency did not have before the Consent Order was signed.]

(h) Within 60 days of signing the agreement, TRC "shall fully characterize the wastes to be deposited in Cells One and Two by delineating the constituents, concentrations, solubilities, and any other parameters which may affect the integrity of liner materials." [There is no evidence in DEP's files, as of 7/1/81, that TRC has complied with this.]

Whenever there is a change in the company's manufacturing processes, TRC is to repeat the characterization described above, and to report the results to DEP with 45 days after the company begins adding new materials to its waste stream.

"This reporting requirement does not expand, change or modify the class of waste that TRC is authorized by its approved registration to deposit in Cells One and Two."

(i) On a quarterly basis, TRC is to take grab samples from the leachate collection sumps, and from the leak detector sumps, in cells one and two, and from five groundwater monitoring wells. These samples are to be analyzed for the components listed by TRC in its characterization report (see paragraph (h) above), or for a subset of those components to be selected by DEP. The leak detector sumps are to be analyzed every two weeks for a subset of 10 components to be selected by DEP. [What is to be done with these data, how they might be used in a regulatory sense, is not specified.]

(j) TRC shall establish a "permanent liner integrity evaluation program to continually study the performance of the liner used in Cells One and Two. This quality assurance program shall provide ongoing data verifying the continuing compatibility of the liners used in Cells One and Two with the wastes deposited therein and fully determine all changes in the physical characteristics of the liner material over time as effected [sic] by contact with the TRC leachate. Within 60 days of the entry of this Administrative

Consent Order, TRC shall submit a written engineering report detailing the full proposal for this liner integrity program...." [DEP files contain no evidence that this has been complied with.]

(k) TRC agrees that DEP has the right to enforce this Consent Order through the courts. [DEP gains no new powers by this.]

(l) TRC will keep records of the rate of leakage into the leak detector area of cell one and cell two and will report its findings to DEP. [TRC had been doing this since April, 1979.]

(m) Nothing in this order limits TRC's legal remedies against DEP enforcement actions.

[It is clear that this Consent Order represents the formal abandonment of DEP's opposition to TRC's continued use of a secure landfill with two leaking primary liners.]

QUESTIONS REMAINING TO BE ANSWERED
ABOUT THE TRC SECURE LANDFILL

Q17: What were the background levels of lithium in site soils and groundwater before the lithium tracer was added to the wastes?

Q18: What concentration of lithium is desirable in the wastes?

Q19: How much waste had been placed in Cell 2 when liquids were found in the leak detector area?

Q20: Is the company using Cell 2 today?

Q21: Was permission to use cells 3-8 revoked or not?

Q22: Where is the groundwater data from monitoring wells?

Q23: Where are the groundwater evaluations reports by Geonics, Inc.?

PART II -- ANTICIPATING FUTURE PERFORMANCE

We have seen that present-day performance of New Jersey's secure landfills fails to meet the regulatory agency's expectations. Not only are leaks occurring in liners, but those leaks are very difficult to analyze, understand, locate and repair. What should we anticipate in the way of future performance by these facilities?

A secure landfill is intended to permanently sequester hazardous materials from the biosphere. To accomplish this, two liners are placed in the ground, wastes are interred, and finally a cover is placed over the entire landfill. In a humid environment (east of the 100th meridian in the U.S.), the cover is the key element in the future success or failure of any secure landfill. In the eastern U.S., one million to 1.25 million gallons of water fall on each acre of land each year. The cover is supposed to prevent rainfall from entering a landfill. What will happen if the cover liner fails? Rainfall will enter; the landfill will begin to fill with liquids. It will become a chemical teapot, steeping as it fills. The rich mixture of chemical compounds will become highly concentrated. When the landfill fills to the brim (the upper edge of the bottom liners), it will begin to spill over. From then on, any new rainfall entering the landfill will cause leachate to spill into the biosphere.

What are the prospects for maintaining the integrity of the cover liner? A review of specific engineering designs will help provide an answer.

MONSANTO SECURE LANDFILL

Monsanto discontinued the use of facility 0809A on September 21, 1978. A letter from Edward S. Jamro of Monsanto to Beatrice S. Tylutki of SWA, dated Oct. 18, 1978, outlines Monsanto's plans for closing facility 0809A. Mr. Jamro said the company planned to place a final cover over the landfill by September, 1980. "The extended timing is needed to allow the graded and filled areas to settle for some time prior to installing the impervious liner. In this way very little settling should occur after the liner is installed and the integrity of that liner should remain intact. If the impervious liner is installed too soon, there is a chance it will not keep its integrity, thus allowing water to penetrate into the buried waste...."[66] A 30 mil PVC liner, 34,500 square yards in area (7.1 acres), was finally put in place to close facility 0809A. Within a year wind and/or water erosion had become a problem. A letter from Edward S. Jamro to the DEP Division of Water Resources May 7, 1981, says "please note that the erosion of the cover material has been corrected."[67]

Closure plans for facility 0809F include 1.5 feet of clay with a maximum in-place permeability of 10^{-7} cm/sec overlain by 12 inches of topsoil. The cover will be graded to facilitate drainage therefrom and shall be revegatated by sowing with grass seed. Cover is to be installed within 6 months of closure of the facility.

DUPONT SECURE LANDFILL

The Jan. 12, 1979, "Certificate of Approved Registration and Engineering Design Approval" says that the "existing section" [facility 1713C] of the Carneys Point landfill will be closed with a cover of 2 feet of clay having a permeability of 10^{-7} cm/sec or less. Cover for the "new sections" [Facility 1713F] will be four feet of clay covered with one foot of soil. However "a synthetic material plus four feet of soil may be substituted for all or part of the clay."

Dec. 6, 1979, George Tyler of DEP wrote George H. Cassedy of DuPont, saying that final cover for Facility 1713F was modified to 2' of clay and 1' of topsoil on the top, and 1.5' of clay and 1' of topsoil on the side slopes.

Mar. 30, 1981, DuPont's George H. Cassedy wrote Lino Pereira of SWA asking for a decision on DuPont's request for a 2:1 slope variance (from the original 3:1). The steeper the final slopes, the more waste the landfill can accommodate, but the more erosion one can expect from precipitation runoff. DEP has made no decision on this variance request.

J.T. BAKER SECURE LANDFILL

A memo from SWA engineer Thomas Sherman to L.C. Hui, dated Nov. 7, 1977, describes a meeting that took place Nov. 3, 1977, between Robert Blanchfield and Ashustosh Majmuder (both of J.T. Baker) and Mr. Sherman. The memo says,

> The J.T. Baker Chemical Co. presented its revised plans for upgrading the existing landfill, including the

> addition of double liners on all future pits....
> The following agreements were reached:....
> 4. The final cover will have 12" soil instead of 6" soil on top of the 6" clay liner. The 12" soil on top of the clay is better than 6" soil on top of clay, because roots may grow deeper than 6" and penetrate the clay and erosion may thin the top soil layer to too shallow a cover.

Closure procedures for J.T. Baker landfill pits are described in the company's "Standard Operating Procedures Manual". The pit is to be filled with soil to bring the top cover up to the level of the access road. In no case will this soil cover be less than 12" thick. This will be graded to a 2% slope and covered with a 6" layer of bentonite clay with a permeability of 10^{-7} cm/sec. Finally, six inches of loam is to be placed over the clay "for plant growth".[68] Drawing BY-35 dated 11-7-77 shows 6" soil, 6" clay, and 12" of loam. This drawing and the "Standard Operating Procedures Manual" are referenced in Section 20 of the "Certificate of Approved Registration and Engineering Design Approval". These same procedures are described in Section 15 -- "Final Cover" -- of the Certificate.

TOMS RIVER CHEMICAL CORP. SECURE LANDFILL

The "Certificate of Approved Registration and Engineering Design Approval" for cell one of the TRC facility [1507D] calls for a final cover consisting of 6" of soil, a 30 mil PVC membrane and 18" of soil graded and grass-seeded. However, the March 12, 1981, Administrative Consent Order requires placement of an "impervious liner" over the top of cell one, placement of an unspecified thickness of soil over the liner, placement of a second cover liner with final soil cover to provide "a stable surface, suitable for dump truck access road needed to place waste in Cell Two on the northern top edge of cell one."[69]

The environmental impact statement that originally described the TRC landfill expansion had discussed the closing in some detail. That document had not mentioned that dump trucks would be driving over any closed cells. "Twenty four inches of soil would be placed over the top membrane and the area would be seeded. Shallow roots and a dense groundcover are the two criteria to be used in vegetation selection. Plants with roots that would not reach the top cover liner would be used to prevent damage to the cover membrane. A zoysia, fescue or other dense grass are possible candidates. The site would also have to be maintained. Shrubs, saplings, etc., would have to be pulled out by the roots and the grass would have to be mowed and fertilized on a periodic basis to maintain a healthy stand."[70]...."An open field would replace the presently wooded land. Future land use plans must be cognizant of the landfill so the site would most probably have to remain a field."[71] Maintaining a perpetual field in Toms River, NJ, will be a formidable and enduring task. The pine and the oak do not choose to remain excluded for long.

Closure was also discussed in an August, 1980, "Revisions to Engineering Design Report...". That report says the closed cells will be contoured to provide grades of 0.5% to 2% on the east and west sides and from 3% to 6% on the north and south ends. Six inches of soil will be placed on the sludge; then a 30 mil PVC membrane will be put in place, followed by two feet of soil, which will be "seeded to stabilize the soil and protect the membrane cover."[72] The report goes on to say, "Trees or shrubs will not be permitted on the membrane because of possible damage from the root system."[73]

The "Certificate of Approved Registration..." for the expansion (cells 3 through 8) calls for final cover to be a 30 mil PVC liner plus two feet of soil. It does not mention perpetual maintenance to prevent trees from destroying the cover.

CONCLUSIONS

None of the engineering designs calls for more than a single cover liner to close these secure landfills (with the exception of TRC's cell one, where part of the landfill will have a second cover liner emplaced to accommodate the passage of dump trucks over it).

No single design plan has tried to accommodate all of the related problems, yet in aggregate we can recognize them: (a) the fill material will tend to settle unevenly, potentially tearing or breaking the cover; (b) soil erosion will tend to remove the soil from the cover liner, exposing the cover liner to natural destructive forces (ultraviolet light, freezing, hail, etc.); (c) because closed landfills frequently become low-cost housing developments and recreation areas, people may eventually drive trucks, bulldozers, motorcycles, and other vehicles across the closed areas, threatening the integrity of the cover liners; (d) burrowing animals will continually threaten the integrity of the cover materials; (e) vegetation will continually send down roots, potentially destroying the integrity of the cover liner.

Unmaintained, a cover liner seems unlikely to survive intact for many years. As soon as the cover liner is breached, rain will begin to enter the underground bathtub created by the double bottom liners. At that point it seems inevitable that the bathtub will eventually fill to its brim and begin to spill over. When that happens, environmental contamination would appear to be unavoidable, except at great expense.

PART III -- RECOMMENDATIONS

Few people would disagree with the premise that we should be striving to minimize the production of hazardous wastes. We should examine products, processes, and raw materials, attempting to eliminate both hazards and wastes. Only when we have failed in these attempts is it appropriate to think about landfilling the results of our failure.

Landfilling should thus be thought of as a technology of last resort, an admission of social failure. Still, we seem likely to have proposals for landfills presented to regulatory agencies in the foreseeable future. It therefore seems only prudent to think about minimizing the problems associated with landfills. Here is a brief list of recommendations intended to minimize the problems that are apparent today with the secure landfills of New Jersey:

1) Facilities should be built with uncontaminated soil and, to the extent feasible, should be built over uncontaminated aquifers. Furthermore, any groundwater monitoring networks should be carefully arrayed specifically to detect pollution from the particular landfill in question as distinct from pollution caused by other potential sources. At the Monsanto site, at the DuPont site, and at the Toms Rivers Chemical site, groundwater has been contaminated by earlier landfilling operations. At the Monsanto site, the landfill was emplaced in an area where dredge fill had been dumped previously. Consulting hydrologists Geraghty and Miller say this

fact has made analysis of the data "much more difficult than usual", according to Monsanto's Edward S. Jamro.[74] The J.T. Baker landfill was built partly with soil contaminated by earlier chemical dumping. This residual contamination makes it difficult to discern what effect a double-lined secure landfill is having on groundwater, and it makes it difficult to learn whether water found in the leak detector system is rainwater filtering through contaminated soil or is leakage through a failed liner.

Constructing a landfill with clean material is relatively simple and easy. Developing a groundwater monitoring network that can distinguish one landfill's pollution from the pollution of neighboring industries is neither simple nor easy.

The recommendation for siting landfills over uncontaminated aquifers is a controversial one. Some environmentalists have recommended siting new facilities in areas that are already contaminated; the rationale is easy to understand — why pollute a new place?

There seems to be only one straightforward answer to the problem: if one wants to site a landfill in a contaminated area, one must thoroughly mix a unique tracer into the wastes so that leakage can be easily and unambiguously detected. Because of the mixed and changing nature of waste streams, I know of only one tracer that will serve: tritium (radioactive hydrogen). If the waste stream itself does not ever contain tritium, and if the site itself has never been contaminated with tritium, a tritium tracer mixed into the wastes will travel well with the leachate and will serve as an unmistakable tracer. So far as I can tell, tritium is the only tracer that will serve; all others may be retarded or degraded by various components of a waste stream. America's chemical industries are characterized by rapid change and so are their waste streams. A dye that serves adequately as a tracer today may well fail tomorrow. The same would be true for any other non-radioactive chemical tracer. But a tritium tracer should maintain its efficacy so long as the waste stream itself did not contain tritium. Tritium has a half-life of 12.3 years, and it is measurable in very small quantities. It has the disadvantage of being something of a political liability for the landfill operator, but it does offer an adequate level of environmental protection and therefore should be the tracer of choice.

2) Specific criteria should be developed for defining "failure" of a liner. What will be measured? What sampling method will be used — flow meter or bucket-and-stopwatch? How many samples will be considered adequate? What analytic techniques will be applied to the samples by what protocols performed in whose laboratory? What statistical tests will be applied to the data? At what level of significance will those tests be carried out?

During construction of a double-lined landfill, rain will probably find its way into the "leak detector" area between the two liners. There does not seem to be any practical way to avoid this. As soon as the facility is constructed, liquids may appear in the leak detector. On the other hand, because of slow movement through soil in the leak detector area, rainwater may not appear in the leak detector sump in substantial quantities for many months after the end of construction of the landfill. This slow rate of movement makes it impossible to pump the leak detector area dry prior to startup. Unambiguous criteria are needed for distinguishing rain from true leakage.

Lack of clear criteria for distinguishing trapped rainwater from leakage causes disputes between the landfill operator and the regulatory agency. Lack of clear criteria makes an agency appear ineffective in regulating operation of a leaking landfill. This inevitably must lead to loss of public confidence in the agency.

3) Companies should be required to collect only relevant data. Some of the data being collected today by landfill operators in New Jersey will never be used by anyone. Its collection represents an expense and a nuisance for the operator. Thoughtful selection of parameters to measure would alleviate some of the burden currently borne by operators.

4) Data should be reported in meaningful ways. Landfill operators in New Jersey today simply report data in long columns of numbers.

The landfill operator should report the raw data, but should also be required to graph the data, so that developing trends are made clear. The operator should also be required to report a running mean (and standard deviation) for each parameter being measured, and the running mean should be graphed (with error bars) as well.

The SWA should purchase and employ a microcomputer to analyze the data as they are reported by each landfill operator. This would provide a simple, low-cost way of reducing the data to meaningful form quickly.

5) For each facility, a committee of local citizens should be established to observe and review relations between the landfill operator and the regulatory agency. Citizens are the ones who have to live with the decisions being made by the agencies and by the operator. Active citizen participation in decision-making, in negotiations, and in planning, would increase the credibility of both the operator and the regulatory agency, and would increase the legitimacy of any decisions reached.

6) The regulatory agency should require full contingency plans of any on-site landfill operator. This would avoid the "I'll have to go out of business if you closely regulate my operation" syndrome. Contingency plans should be developed specifically so that on-site landfill operators have other options for disposing of their wastes if trouble develops at their usual disposal site.

This recommendation seems easy to apply to on-site landfills operated by individual companies for their own exclusive use. For commercial landfills, which accept wastes from numerous generators, the situation is not so clear. In these cases, it would seem to make most sense to put the burden on each generator to develop his (or her) own contingency plan. This could be made a part of the operating permit that each generator receives. The contingency plan could be required to be kept current, to always include at least one feasible option for each generator, so that no generator could claim reliance on a single landfill for long-term waste storage.

7) The state should require worst-case analysis of every conceivable problem that might develop at a facility, plus contingency plans to deal with all of them. This should include liner leakage, long-term maintenance of closed facilities, rehabilitation of polluted groundwater, fires, and toxic fume clouds.

8) The property deed should be indelibly marked "landfill" and should carry permanent restrictions on future uses by virtue of that designation. In addition, a large granite monument (perhaps 30 feet high) bearing a skull and crossbones, erected near one corner of the closed landfill, could serve as a semi-perpetual monument and warning to future generations.

9) Multiple covers (at least three) should be required at closure. As noted above, the cover is the most vulnerable part of a secure landfill and it is at least as important as the bottom liners in terms of guaranteeing the integrity of the site.

A third bottom liner, with a second leak detector system, also seems like a good idea. If leakage were detected in the second leak detector, the facility would — by prior agreement — be entirely exhumed and moved elsewhere. This should be a condition of initial registration and engineering design approval.

10) An on-going liner integrity study program seems a good idea, if it can be implemented. The DEP is requiring Toms River Chemical Corp. to undertake such a program. Its success should be watched carefully. If it proves worthwhile, every landfill could undertake such a program as a condition of registration.

11) Approved designs should avoid the need for trucks to drive over a closed and covered portion of a landfill. Driving trucks over a cover liner is inviting trouble.

12) Multiple sets of files should be kept on each landfill but all of the same information should be kept in each file. This is very important. The DEP now keeps multiple sets of files on each landfill, with some documents duplicated and held in each file and others not. One never knows if one has all the records relating to one facility without visiting several offices.

A key part of the file on a facility should be an "important dates" tickler file — a list of important dates when particular actions must be taken by the operator or by the agency.

13) Money should be provided for perpetual care of all landfills. They will continue to present potential threats to

groundwater for a very long time to come. The long-term costs of perpetual care should be calculated (as best we can) today, and money set aside for all contingencies. This will avoid the unpleasant prospect of this generation saddling future generations with large clean-up costs. Today's generation is paying billions of dollars of clean-up and health costs passed to us by previous generations. Now that we recognize this fact, it is only prudent and right to avoid repeating the mistakes of the past.

14) The time-scale of concern should be spelled out. This is a matter of social choice. So far this subject has not been broached in public discussions of landfills for non-radioactive wastes, so far as I know. How far into the future do we wish to protect the environment? Specific answers will help us design facilities and social programs (insurance, contingency funds, physical monuments, deed restrictions, etc.) to mitigate the problems we're creating by using landfills.

In radioactive waste disposal, fairly broad consensus has been achieved: repositories for high-level waste and for transuranic-contaminated waste are to be constructed with the aim of sequestering the hazardous materials for the duration of the hazard — in some cases, hundreds of thousands of years into the future.

From the viewpoint of public health and environmental protection, I can see no reason why similar objectives should not apply to the sequestration of hazardous non-radioactive wastes. The federal Resource Conservation and Recovery Act (RCRA) specifies that new secure landfills will only be required to maintain their security for 30 years after closure (roughly 50 years into the future after start-up). In my opinion, citizens will oppose the emplacement of new secure landfills that promise only to meet this requirement. It seems clear that such facilities are simply a way of passing today's problems on to our grandchildren.

NOTES AND REFERENCES

[1] Anne Kruger, "Landfill Leachate — An Environmental Hazard" (Unpublished master's thesis, Department of Environmental Science; New Brunswick, NJ: Rutgers University, January, 1976).

[2] A study by the hydrological consulting firm, Geraghty and Miller, found groundwater contamination resulting from 86% of 50 industrial landfills studied. See U.S. Environmental Protection Agency, _The Prevalence of Subsurface Migration of Hazardous Chemical Substances at Selected Industrial Waste Land Disposal Sites_ [EPA SW-634] (Springfield, VA: National Technical Information Service, 1977).

[3] Monsanto Industrial Chemical Company, Technical Services Department, "Environmental Impact Statement for the Proposed Chemical Landfill, Monsanto Company Property, Logan Township, Gloucester County, New Jersey" (Logan Township, NJ: Monsanto, July 6, 1977), p. 1.

[4] Ibid., p. 3.

[5] Ibid., p. 4.

[6] Ibid., P. 3.

[7] Ibid.

[8] Correspondence from Edward S. Jamro, Senior Environmental Engineer, Monsanto, to Walter Burshtin, Chief of Engineering and Enforcement, SWA, April 11, 1978, attaching Exhibit II, "Why a Double Clay Liner is the Most Appropriate Landfill Design."

[9] Correspondence from Walter Burshtin, Chief, Engineering end Enforcement, DEP, SWA, to Jeffrey D. Felder, Monsanto, May 27, 1977, pg. 1.

[10] The Gloucester County Planning Department expressed "serious concerns as to the location of the proposed facility." Letter from Robert V. Scolpino, Planning Director, Gloucester County Planning Department, to the Solid Waste Administration, dated Nov. 21, 1977. The Delaware River Basin Commission [DRBC] said "...we are concerned that operation of the proposed landfill could lead to serious contamination of the Raritan Magothy aquifer.... Our experience with the storage of chemicals (liquid) in clay-lined lagoons has been such that we are dubious of claims that groundwater would not be affected by such a facility". Letter to the Solid Waste Administration from Herbert A. Howlett, Acting Executive Director and Chief Engineer, DRBC, Sept. 16, 1977. The

state Division of Fish, Game and Shellfisheries (within the Department of Environmental Protection) said "The Division.... recommends that the Monsanto, Inc., sanitary landfill be denied for approval unless they can assure that no toxic material of any form will be allowed to enter any water course." Letter from Frank E. Bolton, Assistant Fisheries Biologist, to the Solid Waste Administration dated Aug. 24, 1977; the Gloucester County Health Department flatly opposed the new facility: "We are not in favor of a chemical landfill at this site," said county Environmental Health Coordinator Rita Lezenby, in a letter to Walter Burshtin of SWA, dated ??, ??, 1978; "...[T]his Department is seriously opposed to the proposed chemical landfill at Monsanto Corporation."

[10] Correspondence from Edward S. Jamro, Monsanto, to Frank Coolick, SWA, April 23, 1979, p. 1.

[11] Correspondence from Edward S. Jamro, Monsanto, to Frank Coolick, SWA, dated April 23, 1979; see also correspondence from Frank Coolick of SWA to Edward S. Jamro of Monsanto, dated May 21, 1979.

[12] Correspondence from Edward S. Jamro, Monsanto, to Frank Coolick, SWA, July 28, 1980, attaching "Tracer Study Test Results."

[13] Nicholas Valkenburg and John Isbister, *Ground-Water Investigation in the Vicinity of the New (East) Landfill Monsanto Company, Delaware River Plant, Bridgeport, New Jersey* (Syosset, NY: Geraghty & Miller, January, 1981), pg. 5.

[14] Ibid., pg. 7.

[15] Ibid., Appendix A, Figures 7, 11, 14, 16, 29.

[16] Ibid., p. 7.

[17] Memo to Harry Kachroo through James Hamilton, Chief, Region VI Enforcement [DEP] from Scott Andres through William Altoff and Haig Kasabach, Chief, Bureau of Gound Water Management [DEP], dated April 10, 1981.

[18] The request was denied in correspondence from George Tyler, DEP, to Edward S. Jamro, Monsanto, October 10, 1979. The DEP investigation of Monsanto is mentioned in detail in a DEP memo from Scott Andres to Harry Kachroo (cited above, Note 17); in a DEP memo from Keith A. Onsdorff to Ralph Pasceri, dated June 3, 1981; and in a DEP memo from Bob Blauvelt of the Solid Waste Administration to Bill Altoff of the Division of Water Resources, dated July 27, 1981.

[19] D.R. LaBarbera, P.A. Palmer and W.A. Barlow, "Application Lined Landfill Expansion for Chambers Works E.I. Du Pont de Nemours &

Co. Deepwater, NJ" (Deepwater, NJ: E.I. Du Pont de Nemours & Co., Inc., April, 1978), p. 1.

[20] Ibid.

[21] Thomas Sherman, memo to the file, entitled "Proposed Expansion of the E.I. duPont de Nemours and Co. Chemical Landfill, Carneys Point Township, Salem County," dated Dec. 21, 1977. Mr. Sherman is an engineer with SWA.

[22] Correspondence from T.E. Lewis, General Superintendent, Environmental and Services Department, DuPont, to Walter Burshtin and L.F. Pereira of SWA, June 26, 1979.

[23] Correspondence from Beatrice Tylutki, SWA, to John R. Potts, DuPont, July 3, 1979.

[24] Correspondence from George Cassedy, DuPont, to Beatrice Tylutki, SWA, August 2, 1979.

[25] Correspondence from Lino F. Pereira, director of SWA, to George Cassedy, DuPont, Aug. 31, 1979.

[26] Sidney Siegel, _Nonparametric Statistics for the Behavioral Sciences_ (NY: McGraw-Hill, 1956), pp. 116-127, describes the normal approximation to the Mann-Whitney U test with tie correction, as does John T. Roscoe, _Fundamental Research Statistics for the Behavioral Sciences_ [Second Edition] (NY: Holt, Rinehart and Winston, 1975), pp. 230-237. The two-sample t-test is discussed in Roscoe (just cited), pp. 217-222, and in K.A. Brownlee, _Statistical Theory and Methodology in Science and Engineering_ (NY: John Wiley & Sons, 1965), pp. 297-299.

[27] Ibid.

[28] The question is, do the mean values of any of the four parameters in the "new" samples indicate that the "new" samples were drawn from populations whose mean values exceed the mean values of the populations from which the "background" samples were drawn? An increase in the mean value in the "new" population would be evidence of a leak in the upper liner. A two-sample t-test (for two independent means) appears to be an appropriate statistical test. However, a t-test assumes that the data are normally distributed and tests for normality are inconclusive with a sample as small as 16. Further, the t-test assumes that the variances of the two populations are equal. Consequently, it seems prudent to also apply a Mann-Whitney U-test to the data. The Mann-Whitney U-test is approximately 95% as powerful as the t-test, does not assume normality in the data and makes no assumption about the variances. The U-test does assume that the data are continuously distributed; tied scores violate this assumption and a tie correction is usually calculated.

With both the t-test and the U-test a one-tailed test is appropriate since an increase in the mean(s) of the "new" population(s) is the characteristic of interest. I applied all the tests at the .95 level of significance. The tabled t value that defines the region of rejection (df=40) is -1.684; calculated t values smaller than -1.684 will cause rejection of the null hypothesis and force the conclusion that the "new" sample is drawn from a population having a larger mean than the "background" sample. Table 9 presents the findings.

[29] The question has been raised, what is DEP supposed to do when they find a chemical waste landfill leaking? This subject was broached directly at a public hearing held August 23, 1978, in the Carneys Point municipal building to receive public comment on the DuPont landfill expansion proposal. A Mr. Clark, Superintendent of DuPont's logistics Division, explained the purpose of the double liner system; he said, "The double liner being that if the first liner leaks it will catch it between here and here [obviously referring to a drawing] and then go in and make a repair." Walter Burshtin, Chief of Engineering and Enforcement for the Solid Waste Administration, supported Mr. Clark, saying, "If anything should happen on the first liner, the backup system would be there, but it is up to du Pont to do the repair," he said.

A citizen from Carneys Point, William Rowe, then said, "I think you know there is nothing man-made that is permanent," obviously referring to the Hypalon liners. "I state that as a fact," Mr. Rowe said. Again Walter Burshtin of DEP emphasized DuPont's responsibility: "If there is deterioration it is up to du Pont to do a repair. I might add it would be a very substantial cost but the responsibility is with du Pont. There is no question about this," Burshtin said. However, a letter from Mr. Burshtin's superior within DEP, the then-director of the Solid Waste Administration, Beatrice Tylutki, absolved du Pont of responsibility for repairs in a letter dated Jan. 12, 1979: "If liner damage cannot be repaired, or groundwater damage cannot be contained," she said, "then landfill operations shall be terminated and final cover installed over the entire site within six months of such termination of operation."

To date, DEP has required neither repair nor closure at the Carneys Point landfill.

[30] Clifford Bowers, "Report to J.T. Baker Chemical Company on Brainards Landfill Modifications" (Philadelphia [?]: Metcalf & Eddy, Inc., April 4, 1975), p. 2-1.

[31] Ibid., p. 2-2.

[32] Ibid., p. 2-3.

[33] Ibid.

[34] Correspondence from Robert M. Blanchfield, Manager, Environmental Protection, J.T. Baker, to George J. Tyler, Director, Divison of Environmental Quality, DEP, dated Dec. 21, 1979.

[35] Personal communication from Thomas Sherman August 7, 1981.

[36] Correspondence from Robert M. Blanchfield, J.T. Baker, to George J. Tyler, DEP, Dec. 21, 1979; and correspondence from Robert M. Blanchfield, J.T. Baker, to George J. Tyler, DEP, January 28, 1980.

[37] Personal communication from Dr. Anne Kruger; Dr. Kruger is with the Department of Chemical Engineering, Princeton University.

[38] The statistical tests answer the question, were the "background" samples drawn from a population that has a lower mean value (for each of the six "tracers") than the population from which the "new" samples were drawn?

For the t-tests (df=40), the region of rejection is defined by -1.684; t statistics smaller than this value will cause rejection of the null hypothesis and force the conclusion that the mean of the "new" population is larger than the mean of the "background" population.

[39] Thomas J. Concannon, "Environmental Impact Statement for the Proposed Lined Landfill" (New Brunswick, NJ: Environmental Assessment Council, Inc., May 24, 1978), p. 1.

[40] Correspondence from Beatrice Tylutki, SWA, to W.P. Bobsein, Manager, Environmental Technology, TRC, January 3, 1977.

[41] George J. Tyler, "Administratove Order, In the Matter of the Toms River Chemical Corporation Sanitary Landfill, Dover Township, Ocean County, Solid Waste Facility Registration Number 1507D, Amendment of Approved Registration" (Trenton, NJ: NJ Department of Environmental Protection, May 22, 1980), p. 1.

[42] Ibid.

[43] Thomas J. Concannon, cited above, p. 3.

[44] Ibid., p. 13.

[45] Ibid., pp. 2, 7.

[46] Ibid., Figure 5, p. 11.

[47] Ibid., pp. 20-22.

[48] Ibid., p. 25.

[49] Ibid., p. 37.

[50] Ibid., pp. 45-46.

[51] Charlene Ann Magnano, "State of New Jersey Department of Environmental Protection, Solid Waste Administration, In the Matter of the Application of Toms River Chemical Corporation to Operate a Sanitary Landfill in Dover Township, Ocean County, New Jersey, [verbatim record of a public hearing held in the] Law Enforcement Center, Dover Township, New Jersey, Tuesday, August 8, 1978, 4:00 P.M., Before Mark McQuerrey, Esq.,...Walter Burshtin,...Thomas Sherman...." (Trenton, NJ: Silver & Renzi Reporting Service, undated), p. 23.

[52] Ibid., p. 40.

[53] Correspondence from J. Winkler, Technical Director, TRC, to William L. C. Hui, SWA, April 24, 1979, not in evidence in SWA's Facility 1507D file, but referred to in correspondence from J. Winkler, TRC, to Beatrice S. Tylutki, SWA, May 24, 1979.

[54] Charlene Ann Magnano, cited above, p. 12.

[55] Correspondence from J. Winkler, TRC, to William L.C. Hui, SWA, May 24, 1979.

[56] Correspondence from W.P. Bobsein, TRC, to Frank Coolick, SWA, September 19, 1979.

[57] Correspondence from J. Winkler, TRC, to Beatrice S. Tylutki, SWA, May 24, 1979, p. 2.

[58] Correspondence from W.P. Bobsein, TRC, to Frank Coolick, SWA, September 10, 1979.

[59] Correspondence from W.P. Bobsein, TRC, to Lino F. Pereira, SWA, Feb. 14, 1980.

[60] George J. Tyler, "Administrative Order...May 22, 1980," cited above, p. 5.

[61] Correspondence from Clyde A. Szuch, Pitney, Hardin & Kipp, Morristown, NJ, to SWA ("Re: Administrative Order dated May 22, 1980..."), June 11, 1980, p. 2.

[62] Ibid., p. 5.

[63] Clyde A. Szuch, correspondence to SWA ("Re: Administrative Order dated October 1, 1980..."), October 17, 1980, p. 9.

[64] New Jersey Administrative Code, 7:26-1.4, Supp. 7-24-78.

[65] I consulted two dictionaries, which gave identical definitions --

Webster's New International Dictionary of the English Language, Second Edition, Unabridged (Springfield, MA: G. & C. Merriam Co., 1957), and Webster's Third New International Dictionary of the English Language, Unabridged (Springfield, MA: G. & C. Merriam Co., 1971).

[66] Correspondence from Edward S. Jamro, Monsanto, to Beatrice S. Tylutki, SWA, Oct. 18, 1978.

[67] Correspondence from Edward S. Jamro to "Water Quality Management Element, Division of Water Resources," DEP, May 7, 1981.

[68] Metcalf & Eddy, Inc., Standard Operating Procedures Manual for Brainards Landfill Site Owned and Operated by J.T. Baker Chemical Company, Phillipsburg, NJ. (Philadelphia [?]: Metcalf & Eddy, Inc., July, 1977), p. 6.

[69] John J. Stanton (of DEP) and J. Petri (of TRC), "Administrative Consent Order in the Matter of Toms River Chemical Corporation Secure Landfill...Facility 1507D," dated March 12, 1981, p. 2.

[70] Thomas J. Concannon, cited above, p. 48.

[71] Ibid., p. 51.

[72] Vincent S. Wroniewicz, "Revisions to Engineering Design Report Dated April 1978, Solid Waste Disposal Facility (No. 1507-D) for the Toms River Chemical Corporation, Revision Date August 1980" (Philadelphia, PA: Catalytic, Inc., Aug., 1980), p. 1.

[73] Ibid., p. 2.

[74] Correspondence from Edward S. Jamro, Monsanto, to Frank Coolick, SWA, reporting the opinion of Geraghty & Miller, April 14, 1980.

TABLE 1

MONSANTO SECURE CHEMICAL LANDFILL PERMITTED WASTE TYPES

I.D.	WASTE
10	Municipal (commercial)
13	Bulky Waste
18	Dry Non-hazardous chemical waste (residue of tetrachlorophthalic anhydride, phthalic anhydride pitch, and inert materials from lime slaker operations only)
27	Non-chemical industrial waste (filter paper wetted with benzyl phthalate ester, and filter aid of dicalite [diatomaceous earth] wetted with phosphate ester only)
74	Liquid sewage sludge (treated chemical sludges of calcium chloride, benzyl phthalate esters, phosphate esters, tetrachlorophathalic [sic] anhydride and phthalic anhydride only)

Table 1. Waste types permitted at the Monsanto secure chemical landfill. Source: "Certificate of Approved Registration and Engineering Design Approval Facility 0809F" (Trenton, NJ: N.J. Department of Environmental Protection, June 2, 1978), p. ??.

TABLE 2

MONSANTO SECURE CHEMICAL LANDFILL
ANALYSIS OF ONE SLUDGE SAMPLE (SOLID AND LIQUID)

NOTE: mcg = microgram

SOLID	ANALYSIS
Vanadium mg/kg	<20.0
Nitrate mg/kg	160.0
Sulfate mg/kg	<50.0
Chloride mg/kg	7188
Cyanide mcg/kg	250
Ether soluble mg/kg	48874
Phosphate mg/kg	4385
Arsenic mcg/kg	2200
Selenium mcg/kg	175.0
Beryllium mg/kg	<5.0
Silver mg/kg	1.5
Calcium mg/kg	4800
Sodium mg/kg	1840
Mercury mcg/kg	203
Nickel mg/kg	5.0
Titanium mg/kg	<10.0
Cadmium mg/kg	0.4
Chromium (VI) mg/kg	<0.2
Copper	10.0
Iron mg/kg	5000
Lead mg/kg	8.0
Manganese mg/kg	120.0
Zinc mg/kg	60.0
Cobalt mg/kg	<1.0

LIQUID	ANALYSIS
BOD_5 mg/l	11600
Fecal coliform	0/100
Fecal streptococci	0/100
Total coliform	0/100
Color APHA	460
Odor	11*
pH	5.8
TDS mg/l	29226
Suspended solids mg/l	165
COD mg/l	20604
Phenols mg/l	392
Phosphate (PO_4) mg/l	7.6
Total phosphorus mg/l	10.0
Total nitrogen mg/l	518
Ammonia nitrogen mg/l	474

Nitrate mg/l	1.0
Sulfate mg/l	<5.0
Chloride mg/l	15395
Cyanide mg/l	0.020
Ether soluble mg/l	36.7
Total chlorinated Hydrocarbons ppm	<1.0
Waste [sic] soluble Chlorinated Hydrocarbons ppm	<1.0
Arsenic mcg/l	10.0
Cadmium mg/l	0.15
Chromium (VI) mg/l	<0.02
Copper mg/l	0.25
Vanadium mg/l	<2.0
Beryllium mg/l	<0.5
Silver mg/l	0.05
Sodium mg/l	1200
Iron mg/l	70.0
Lead mg/l	1.0
Manganese mg/l	14.5
Zinc mg/l	0.46
Mercury mcg/l	90.0
Nickel mg/l	1.1
Titanium mg/l	<1.0
Cobalt mg/l	<0.1
Calcium mg/l	1800

Table 2. Analysis of one sample of sludge intended for disposal in the Monsanto Industrial Chemical Company's secure chemical landfill. Source: Jeffrey D. Felder, "Design of Chemical Landfill Operations on the Monsanto Company Plant Site, Bridgeport, NJ, July 6, 1977, p. 38.

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[*] Eleven on the odor intensity index, which is the number of times that the original sample must be diluted in half with odor-free water for the odor to be just discernible.

TABLE 3

DUPONT SECURE LANDFILL
ANNUAL WASTE LOAD

WASTE	APPROXIMATE UNITS PER YEAR
Bulky Waste	<10 tons
Dry hazardous waste	
Drummed waste	2000 tons
Bulk waste	<100 tons
Dry non-hazardous chemical waste	
Primary sludge	53,000 tons
Drummed wastes	3500 tons
Bulk waste	<100 tons
Oil spill cleanup wastes	<10 tons
Waste oil and oil sludges	10,000 gallons

Table 3. Annual waste load at the Carneys Point Landfill operated by E.I. DuPont de Nemours & Co. Data from: D.R. LaBarbera, P.A. Palmer, and W.A. Barlow, APPLICATION LINED LANDFILL EXPANSION for CHAMBERS WORKS E.I. DU PONT DE NEMOURS & CO. Deepwater, NJ, April, 1978, pg. 11.

TABLE 4

DUPONT SECURE LANDFILL
PRIMARY SLUDGE

COMPONENTS	TYPICAL ANALYSIS
Volatiles, wt %	24
Non-volatile ash, wt %	76
Carbon, wt %	7-16
Hydrogen, wt %	2-3
Nitrogen, wt %	0.8-2
Calcium, wt %	5-7
Magnesium, wt %	14-35
Iron, wt %	1-2
Silicon, wt %	5-25
Chromium, wt %	0.04-0.08
Copper, wt %	0.01-0.09
Zinc, wt %	0.2
Aluminum, wt %	2-10
Phosphorus, wt %	0.8-3
Manganese, wt %	0.008-0.01
Nickel, wt %	0.01-0.04
Sodium, wt %	2-10
Lead, ppm	50-250
Titanium, ppm	50-250
Tin, ppm	50-250
Boron, ppm	50-250
Molybdenum, ppm	50-250
Cobalt, ppm	10-50
Cadmium, ppm	3
Silver, ppm	40
Alkalinity, g $CACO_3$/g sludge	1
Density, lb/ft^3 presscake	85
pH	8-11

Table 4 -- Primary sludge is "the cake discharge from a pressure filter in the primary treatment area of the Waste Water Treatment Plant. Solids content is about 40%; pH is 8 to 11." Source: D.R. LaBarbera, P.A. Palmer, and W.A. Barlow, APPLICATION LINED LANDFILL EXPANSION for CHAMBERS WORKS E.I. DU PONT DE NEMOURS & CO. Deepwater, NJ, April, 1978, pgs. 5, 12.

TABLE 5

DUPONT SECURE LANDFILL
TYPICAL DRUMMED WASTES

WASTE	CONTENTS
2AAQ Residue	polymerized 2-amyl anthraquinone
"Adiprene" waste	isocyanate polyether - 88% trash - 2%; oil, dry - 8% glycols - 1%; triclene - 1%
"Carpacyl" waste	cobalt or chromium hydroxides - 25% filter aid - 25%; water
Cresol sludge	Ethyl-o-amino-p-cresol tar - 83% filter aid - 17%
C.V. Tar	Dimethylaniline residue and zinc
Darco	carbon black, filter aid, tar
3,4-DCA	3,4-dichloroaniline
DEAM Tar	polymerized diethylaminoethyl methacrylate
DHPT Tar	p-Toluidine - 62%; sulfur - 38%
DIPAM Tar	polymerized diisopropylaminoethyl methacrylate
2EHMA Tar	polymerized 2-ethyl hexyl methacrylate
Fischers Base Tar	Fischers Base - 50%; tar - 20%; water - 20%; NaBr and NaOH
Spent gel	Spent silica gel
"Hylene" T residue (1141)	Toluene diisocyanate - 5% [50%?]; TDI polymers and condensates - 50%
"Hylene" W Tar (1160)	p-isocyanate cyclohexylmethylene - 50%; ureas - 50%
ICL Tar	polymerized isophthaloyl chloride
"Merpacyl" sludge	filter aid and carbon - 15%; dyes - 5%; water
Molecular seives	Spent 4A molecular seives
Nitrobody sludge	chloronitrobenzene
PAN Tar	Phenyl-alpha naphthylamine - 25%; Tar - 70%; volatiles - 5%
"Pontamine" sludge	filter aid - 45%; organics - 2%; water
"Sevron" sludge	filter aid - 45%; organics - 2%; water
"Stylacyl" sludge	filter aid and carbon black - 15%; dye - 5%; water
TCL Tar	polymerized tetraphthaloyl chloride
TPT Tar	polymerized tetraisopropyl titanate;

	mineral oil; NH_4Cl and TiO_2
Urea (NP)	Urea of toluene diisocyanate
"Viton" waste	polymeric fluorocarbons - 84%; trash - 5%; water - 11%
"Vydax"	Low molecular weight fluoropolymer
"Zalba" waste	phenolic anti-oxidants - 15%; toluene - 5%;filters
"Zepel" bottoms	Complex fluourinated [sic] esters
zinc acetate	zinc acetate - 70%; acetic acid - 30%

Table 5 - Typical drummed wastes placed in the Dupont Carneys Point secure landfill. Source: D.R. LaBarbera, P.A. Palmer, and W.A. Barlow, APPLICATION LINED LANDFILL EXPANSION for CHAMBERS WORKS E.I. DU PONT DE NEMOURS & CO. Deepwater, NJ, April 1978, pg. 13-14.

TABLE 6

DUPONT SECURE LANDFILL
LIST OF DRUMMED AND BULK CHEMICAL WASTES
(Revised Jan. 15, 1979)

Amyl anthraquinone residues
aromatic acids
aromatic acid chlorides
aromatic amines
aromatic chloramine tars
organic sulfates
organic chloride
vinyl benzenes
dye wastes
ethylene/propylene rubber
fluoropolymers
spent silica gel
complex glycols
inorganic fluorides
aromatic imides and amides
isocyanates
methacrylates
urethanes
molecular seives
organic carbonates
nitrobody sludges
resins and waxes
filter aids
calcium hydroxides
methoxy-methylenes
titanates
organic phosphates
zinc acetates
hindered phenolics
PACT* sludge
ethylated amines

Table 6 - Revised list of drummed and bulk chemical wastes placed in the Dupont Carneys Point secure landfill. Source: D.R. LaBarbera, P.A. Palmer, and W.A. Barlow, APPLICATION LINED LANDFILL EXPANSION for CHAMBERS WORKS E.I. DU PONT DE NEMOURS & CO. Deepwater, NJ April, 1978, page inserted following pg. 14.

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* DuPont service mark.

TABLE 7

DUPONT SECURE LANDFILL
ANALYSES OF LEACHATE — AREA #1

PARAMETER	3/76	6/76	9/76	12/76	2/77	6/77	8/77
TDS mg/l	576	1588	911	3450	1680	6084	6761
Phenolics mg/l	0.062	0.096	0.050	0.163	0.280	0.480	0.270
Color APHA	-	500	150	800	600	-	1600
COD mg/l	112	364	-	581	105	1401	3175

Table 7. Analysis of leachate collected from Area #1 [Facility 1713C] of the DuPont Carneys Point Landfill on various dates, 1976-1977. Data attached to letter from George Cassedy, Superintendent of DuPont's Environmental Control Division, to Beatrice S. Tylutki, then director of the Solid Waste Administration, N.J. Department of Environmental Protection, Aug. 2, 1979.

TABLE 8

DUPONT SECURE LANDFILL
ANALYSIS OF LIQUID FROM LEAK DETECTORS — AREA #2

PARAMETER	3/79	5/79	7/79
Leak Detector No. 1			
TDS mg/l	614	515	560
Phenolics mg/l	0.016	0.050	0.047
Color APHA	150	200	60
CCD mg/l	603	58	70
Leak Detector No. 2			
TDS mg/l	464	536	796
Phenolics mg/l	0.017	0.07	0.12
Color APHA	100	200	110
COD mg/l	63	55	62

Table 8. Analysis of liquids pumped from the leak detector area between the primary and secondary liners of the new section [Facility 1713F] of the Dupont Carneys Point secure landfill, 3/79-7/79. Source of data: same as Table 7.

TABLE 9

DUPONT SECURE LANDFILL
MEANS OF FOUR "TRACERS"
AND CALCULATED T STATISTICS

(A single asterisk indicates a t value significant at the 0.95 level.)

	TDS mg/l	PHENOLICS mg/l	COLOR APHA	COD mg/l
LEAK DETECTOR 1				
Background mean	627.56	0.088	154.0	139.96
N	16	16	15	16
S.D.	364.42	0.094	133.7	163.62
New mean	1276.01	0.268	598.92	132.11**
N	37	37	37	36
S.D.	325.36	0.149	733.12	67.42
t statistic	-6.426*	-4.442*	-2.322*	0.247
LEAK DETECTOR 2				
Background mean	543.56	0.070	102.2	51.98
N	16	16	15	16
S.D.	196.38	0.072	39.31	24.55
New mean	1156.32	0.195	347.24	83.69
N	38	38	38	38
S.D.	477.56	0.073	293.53	55.06
t statistic	-4.938*	-2.019*	-3.203*	-2.204*

Table 9. Mean values of the four "tracers" designated to determine whether the primary liner is leaking at the Dupont Carneys Point landfill [Facility 1713F]. The "background mean" represents the average of 16 values reported by the company between 12/22/79 and 8/31/79. The "new mean" represents the average of values reported by the company between 9/10/79 and 3/23/81. The complete data appear in Appendix A. S.D. = estimated population standard deviation.

** Had I not omitted a COD measurement, reported by DuPont as 2279 on 7/28/80, this mean would be 190.14; the company termed the value "suspect" and "being reviewed"; consequently I omitted it from the analysis. If this measurement were included, the calculated t statistic would be -0.533, a value not significant at the 0.95 level. See note with Table 10.

TABLE 10

DUPONT SECURE LANDFILL
CALCULATED MANN-WHITNEY VALUES

(A single asterisk indicates a value that is significant at the 0.95 level.)

	TDS mg/l	PHENOLICS mg/l	COLOR APHA	COD mg/l
LEAK DETECTOR 1				
Z statistic	-4.824*	-4.369*	-3.151*	-1.537**
LEAK DETECTOR 2				
Z statistic	-4.376*	-2.987*	-3.818*	-2.113*

Table 10. Normal approximations to the Mann-Whitney U statistic, using the same data used to calculate values reported in Table 9. The complete data appear in Appendix A.

** If I had included the "suspect" COD value described in the note to Table 9, this Z statistic would be -1.657, which is significant at the .95 level

TABLE 11

J.T. BAKER SECURE LANDFILL
ANALYSIS OF ONE SAMPLE OF SAND
USED IN CONSTRUCTION OF LEAK DETECTOR AREAS

NOTE: mcg = microgram

MATERIAL	MEASURED VALUE
Bismuth mg/l	<0.2
Lead mg/l	<0.2
Magnesium mg/l	21.5
Potassium mg/l	2.1
Sodium mg/l	5.9
Arsenic mg/l	<0.005
Selenium mg/l	<0.005
pH	8.9
Thiocyanate mg/l	1.4
TDS mg/l	391
TOC mg/l	92
Trichloroethylene mcg/l	<0.5
Benzene mg/l	<1.0

Table 11. Analysis of a sample of the sand used to fill the leak detector area between the primary and secondary liners during construction of the four secure landfill pits at the Brainards Landfill used by J.T. Baker Chemical Co. These tests were completed April 17, 1980, by Brandt Associates, Inc., of Martins Creek, PA, at the request of J.T. Baker "[i]n an effort to determine where some of the high levels of thiocyanate, bismuth, and trichloroethylene in the LDS [leak detector system] were generated from...." Source: Correspondence from Robert M. Blanchfield, J.T. Baker Chemical Co., to William L.C. Hui, DEP, April 29, 1980.

NOTE: It is not clear why these data are reported in units of mg/l instead of mg/kg, which would be the units expected for soil analyses.

TABLE 12

J.T. BAKER SECURE LANDFILL MEANS AND T STATISTICS

(A single asterisk indicates a t value that is significant at the 0.95 level.)

	Arsenic (mg/l)	Magnesium (mg/l)	Thiocyanate (mg/l)	TDS (mg/l)	TOC (mg/l)	Potassium (mg/l)
PIT 17						
Background mean.......	0.005	21.7	1.25	355	9.6	11.46
N	8	19	19	19	19	19
S.D.	0.00	3.72	1.32	82.93	7.51	10.70
New mean	0.08	30.96	10.68	742	37.6	6.24
N	40	40	40	39	40	40
S.D.	0.09	7.04	4.85	181.75	29.67	4.47
t statistic	-2.46*	-5.37*	-8.29*	-8.80*	-4.03*	2.65
PIT 18						
Background mean.......	0.005	23.8	0.39	317.6	10.9	2.33
N	8	19	19	19	19	19
S.D.	0.00	3.91	0.56	67.35	5.22	0.93
New mean	0.37	29.3	1.27	447.0	11.6	2.33
N	40	40	40	39	40	40
S.D.	0.43	7.26	3.20	96.61	14.77	1.58
t statistic	-2.42*	-3.10*	-1.18	-5.24*	-0.19	0.01

Table 12. Mean values, and calculated T statistics, for six "tracer" compounds or elements in two double-lined pits at the J.T. Baker landfill site in Harmony Township, Warren County, NJ. The "background mean" encompasses values measured between 12/12/79 and 5/21/80. S.D. = estimated population standard deviation. The "new mean" encompasses values measured between 5/27/80 and 3/23/81. T statistics smaller than -1.648 indicate a significant increase in mean value in the "new" data compared to the "background" data. Test is one-tailed; level of significance is .95. Data appear in Appendix B.

TABLE 13

J.T. BAKER SECURE LANDFILL
NORMAL APPROXIMATIONS
TO THE MANN-WHITNEY U STATISTIC
(WITH TIE CORRECTION)

(A single asterisk indicates a value that is significant at the 0.95 level.)

	Arsenic (mg/l)	Magnesium (mg/l)	Thiocyanate (mg/l)	TDS (mg/l)	TOC (mg/l	Potassium (mg/l)
PIT 17						
Z statistic	-3.03*	-5.35*	-6.11*	-5.77*	-3.26*	-1.42
PIT 18						
Z statistic	-3.03*	-4.26*	-0.55	-4.87*	-1.68*	-1.04

Table 13. Normal approximations (Z) to the Mann-Whitney U statistic, using data tabled in Appendix B (means shown in Table 12). The region of rejection is defined by -1.645; values smaller than this cause rejection of the null hypothesis, forcing the conclusion that the "new" mean is larger than the "background" mean at the .95 level of significance.

TABLE 14

ANALYSIS OF TOMS RIVER CHEMICAL'S EPOXY RESIN WASTES

Analysis	Total mg/kg in waste	mg/kg extracted from waste	mg/l conc. in extract
pH			10.1
C.O.D.		30,921	324
Phenols	11	-	-
Phosphorus	14	4	0.1
Sulfate	150	150	3
Chloride	98,000	57,000	1,330
TDS	-	136,000	2,730
Cadmium	0.1	-	-
Chromium (Total)	3	-	-
Copper	1	-	-
Iron	1	-	-
Lead	0.1	-	-
Manganese	1	-	-
Zinc	2	-	-
Flash point	165°C		
Chlorinated Hydrocarbons	-	-	-
Chlorinated Hydrocarbons (Ether extract)	-	-	-

Table 14. Analysis of expoxy resin residues interred in the Toms River Chemical Corp. secure chemical landfill. Extraction done with water adjusted to pH 6, except the ether-extracted chlorinated hydrocarbons. Source: Thomas J. Concannon, Environmental Impact Statement for the Proposed Lined Landfill, (New Brunswick, NJ: Environmental Assessment Council, May 24, 1978), Appendix B.

TABLE 15

ANALYSIS OF TOMS RIVER CHEMICAL'S CLARIFICATION RESIDUES

Analysis	Total mg/kg in waste	mg/kg extracted from waste	mg/l conc. in extract
pH			9.7
COD		16,000	324
Phenols	-	-	-
Phosphorus	11	4	1.2
Sulfate	1157	977	14.8
Chloride	1600	200	4
TDS		8,000	197
Cd	0.1	-	-
Chromium (Total)	180	-	-
Copper	386	3	0.05
Iron	2400	2	0.02
Lead	4	1.0	0.02
Manganese	957	-	-
Zinc	5	-	0.02
Flash point	200°C		
Chlorinated Hydrocarbons		-	-
Chlorinated Hydrocarbons (Ether extract)	-	17,000	705

Table 15. Analysis of clarification residues, Toms River Chemical Corp. secure landfill, Dover Township, Ocean County. Extractions done with water adjusted to pH 6, except ether extracted chlorinated hydrocarbons. Source: Thomas J. Concannon, Environmental Impact Statement for the Proposed Lined Landfill (New Brunswick, NJ: Environmental Assessment Council, May 24, 1978), Appendix B.

TABLE 16

ANALYSIS OF TOMS RIVER CHEMICAL'S DISTILLATION RESIDUES

Analysis	Total mg/kg in waste	mg/kg extracted from waste	mg/l conc. in extract
pH			3.3
COD		43,900	880
Phosphorous	1	1	0.04
Sulfate	1700	150	3
Chloride	16000	16000	330
TDS		6910	121
Cadmium	0.1	-	-
Chromium (Total)	3	1	0.02
Copper	67	33	0.7
Iron	300	250	5
Lead	2	2	0.03
Manganese	3	3	0.06
Zinc	2	2	0.03
Flash point	82°C		
Chlorinated Hydrocarbons	-	5	0.1
Chlorinated Hydrocarbons (Ether Extract)	-	20,800	842

Table 16. Analysis of Distillation Residues, Toms River Chemical Corp. secure landfill. Extractions done with water adjusted to pH 6 with the exception of ether-extracted chlorinated hydrocarbons. Source: Thomas J. Concannon, _Environmental Impact Statement for the Proposed Lined Landfill_ (New Brunswick, NJ: Environmental Assessment Council, May 24, 1978), Appendix B.

APPENDIX A

(A value shown as 999.000 = no data reported.)

DATA FROM DUPONT SECURE LANDFILL

BACKGROUND DATA -- LEAK DETECTOR NO. 1

DATE	TDS mg/l	PHENOL mg/l	COLOR APHA	COD mg/l
02/22/79	1910.000	0.070	240.000	322.000
03/26/79	758.000	0.016	550.000	363.000
03/30/79	614.000	0.016	150.000	603.000
04/04/79	426.000	0.030	60.000	210.000
04/09/79	412.000	0.097	70.000	37.700
04/16/79	358.000	0.055	60.000	36.800
04/23/79	417.000	0.043	100.000	18.900
04/30/79	503.000	0.051	150.000	69.700
05/08/79	515.000	0.050	200.000	57.600
05/14/79	700.000	0.204	250.000	71.500
05/22/79	748.000	0.110	250.000	50.000
06/18/79	439.000	0.020	70.000	49.100
07/09/79	560.000	0.047	60.000	70.000
07/23/79	512.000	0.079	60.000	41.300
08/13/79	482.000	0.126	40.000	31.700
08/28/79	687.000	0.390	999.000	207.000

APPENDIX A (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM DUPONT SECURE LANDFILL

NEW DATA -- LEAK DETECTOR NO. 1

DATE	TDS mg/l	PHENOL mg/l	COLOR APHA	COD mg/l
09/10/79	1026.000	0.099	75.000	49.000
09/24/79	856.000	0.160	400.000	66.000
10/08/79	720.000	0.130	80.000	21.400
10/22/79	731.000	0.190	70.000	46.000
11/12/79	704.000	0.210	100.000	62.000
11/26/79	935.000	0.210	100.000	164.000
12/10/79	999.000	999.000	999.000	999.000
12/26/79	1339.000	0.189	160.000	81.000
01/14/80	1202.000	0.350	120.000	72.000
01/29/80	966.000	0.200	110.000	78.000
02/12/80	1017.000	0.170	100.000	96.000
02/25/80	1017.000	0.180	120.000	78.000
03/10/80	1070.000	0.110	120.000	70.000
03/24/80	683.000	0.190	100.000	61.000
04/15/80	918.000	0.189	300.000	111.000
04/28/80	1631.000	0.120	150.000	65.000
05/12/80	1031.000	0.236	225.000	140.000
05/27/80	1388.000	0.270	250.000	120.000
06/09/80	1346.000	0.130	300.000	106.000

APPENDIX A (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM DUPONT SECURE LANDFILL

NEW DATA -- LEAK DETECTOR NO. 1

DATE	TDS mg/l	PHENOL mg/l	COLOR APHA	COD mg/l
06/24/80	1243.000	0.060	180.000	102.000
07/14/80	1336.000	0.310	350.000	130.000
07/28/80	1431.000	0.190	800.000	2279.000
08/12/80	1908.000	0.530	800.000	289.000
08/26/80	1379.000	0.550	900.000	238.000
09/08/80	1357.000	0.350	450.000	62.000
09/22/80	1517.000	0.280	500.000	182.000
10/13/80	1319.000	0.200	1000.000	170.000
10/27/80	1360.000	0.430	800.000	138.700
11/10/80	1688.000	0.640	1000.000	271.500
11/24/80	1498.000	0.519	2000.000	211.000
12/08/80	1469.000	0.350	2250.000	180.000
12/22/80	1478.000	0.370	100.000	185.500
01/15/80	1443.000	0.510	1250.000	189.000
01/26/80	1547.000	0.456	3000.000	202.000
02/09/81	1532.000	0.280	250.000	175.000
02/23/81	1678.000	0.010	400.000	193.000
03/09/81	1642.000	0.280	2500.000	165.000
03/23/81	1810.000	0.260	750.000	186.000

APPENDIX A (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM DUPONT SECURE LANDFILL

BACKGROUND DATA -- LEAK DETECTOR NO. 2

DATE	TDS mg/l	PHENOL mg/l	COLOR APHA	COD mg/l
02/22/79	691.000	0.000	100.000	55.400
03/26/79	292.000	0.008	80.000	57.100
03/30/79	464.000	0.017	100.000	63.000
04/04/79	479.000	0.068	150.000	111.500
04/09/79	310.000	0.049	60.000	6.300
04/16/79	445.000	0.102	120.000	36.800
04/23/79	433.000	0.009	140.000	15.800
04/30/79	409.000	0.049	60.000	54.500
05/08/79	536.000	0.070	200.000	54.500
05/14/79	504.000	0.039	55.000	44.700
05/22/79	485.000	0.031	100.000	39.700
06/18/79	391.000	0.040	78.000	78.000
07/09/79	796.000	0.120	110.000	62.000
07/23/79	865.000	0.299	110.000	63.300
08/13/79	621.000	0.094	70.000	29.000
08/28/79	976.000	0.120	999.000	60.000

APPENDIX A (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM DUPONT SECURE LANDFILL

NEW DATA -- LEAK DETECTOR NO. 2

DATE	TDS mg/l	PHENOL mg/l	COLOR APHA	COD mg/l
09/10/79	1025.000	0.078	100.000	45.000
09/24/79	1253.000	0.130	700.000	62.000
10/08/79	742.000	0.070	130.000	0.000
10/22/79	584.000	0.060	80.000	35.000
11/12/79	551.000	0.060	125.000	45.000
11/26/79	551.000	0.060	80.000	44.000
12/10/79	585.000	0.150	70.000	7.000
12/26/79	654.000	0.130	120.000	39.000
01/14/80	581.000	0.060	120.000	36.000
01/29/80	560.000	0.040	80.000	23.000
02/12/80	595.000	0.090	100.000	56.000
02/25/80	904.000	0.260	200.000	81.000
03/10/80	829.000	0.120	180.000	86.000
03/24/80	974.000	0.230	160.000	88.000
04/15/80	500.000	0.110	75.000	52.000
04/28/80	264.000	0.090	150.000	33.000
05/12/80	690.000	0.118	200.000	73.000
05/27/80	1177.000	0.650	400.000	91.000
06/09/80	1242.000	0.500	800.000	111.000

APPENDIX A (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM DUPONT SECURE LANDFILL

NEW DATA -- LEAK DETECTOR NO. 2

DATE	TDS mg/l	PHENOL mg/l	COLOR APHA	COD mg/l
06/24/80	1280.000	0.230	350.000	105.000
07/14/80	1394.000	1.370	450.000	136.000
07/28/80	1654.000	0.330	1250.000	26.500
08/12/80	1669.000	0.350	700.000	118.000
08/26/80	1667.000	0.390	1100.000	207.000
09/08/80	1505.000	0.390	500.000	83.000
09/22/80	1671.000	0.290	700.000	200.000
10/13/80	1954.000	0.060	500.000	192.000
10/27/80	1961.000	0.240	500.000	40.200
11/10/80	1148.000	0.090	200.000	250.000
11/24/80	1320.000	0.063	500.000	93.000
12/08/80	1427.000	0.090	300.000	89.000
12/22/80	1450.000	0.070	100.000	94.500
01/15/80	1403.000	0.070	750.000	100.000
01/26/80	1604.000	0.047	300.000	98.000
02/09/81	1693.000	0.040	250.000	91.000
02/23/81	1770.000	0.200	200.000	88.000
03/09/81	1568.000	0.050	275.000	71.000
03/23/81	1541.000	0.033	400.000	91.000

APPENDIX B

(A value shown as 999.000 = no data reported.)

DATA FROM J.T. BAKER SECURE LANDFILL

BACKGROUND DATA -- PIT 17

DATE	Arsenic mg/l	Magnesium mg/l	Thiocyanate mg/l	TDS mg/l	TOC mg/l	Potassium mg/l
12/12/79	999.000	13.700	3.410	214.000	25.000	4.300
12/28/79	999.000	16.600	1.600	360.000	1.000	7.600
01/04/80	999.000	16.700	1.500	417.000	7.000	24.000
01/18/80	999.000	999.000	999.000	999.000	999.000	999.000
01/23/80	999.000	22.500	0.100	408.000	12.000	30.000
01/31/80	999.000	23.300	0.600	379.000	13.000	28.000
02/07/80	999.000	19.300	0.100	375.000	15.000	27.000
02/14/80	999.000	21.200	0.300	294.000	9.000	26.000
02/28/80	999.000	20.700	0.200	386.000	8.000	24.000
03/06/80	999.000	22.300	0.300	278.000	9.000	8.000
03/13/80	999.000	23.400	0.500	357.000	6.000	6.400
03/27/80	999.000	22.500	0.300	346.000	32.000	6.800
04/03/80	0.005	22.000	0.200	353.000	7.000	4.200
04/11/80	0.005	21.100	0.100	305.000	5.000	3.600
04/17/80	0.005	20.000	0.100	325.000	5.000	3.400
04/24/80	0.005	22.400	2.500	291.000	5.000	3.500
05/01/80	0.005	23.300	2.700	290.000	5.000	3.900
05/13/80	0.005	22.900	3.700	325.000	8.000	2.600
05/21/80	0.005	28.600	2.200	428.000	7.000	1.500
05/27/80	0.005	29.800	3.400	615.000	4.000	2.900

APPENDIX B (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM J.T. BAKER SECURE LANDFILL

NEW DATA -- PIT 17

DATE	Arsenic mg/l	Magnesium mg/l	Thiocyanate mg/l	TDS mg/l	TOC mg/l	Potassium mg/l
05/27/80	0.010	30.900	6.400	670.000	4.000	2.900
06/04/80	0.005	30.100	6.300	815.000	7.000	2.700
06/09/80	0.005	31.900	7.200	820.000	2.000	3.700
06/16/80	0.005	28.900	9.200	848.000	8.000	2.900
06/23/80	0.005	29.500	10.600	676.000	5.000	2.200
06/30/80	0.005	30.200	8.900	355.000	4.000	5.000
07/11/80	0.005	32.000	13.400	494.000	16.000	4.400
07/14/80	0.005	34.000	10.100	569.000	5.000	4.500
07/28/80	0.009	29.700	18.600	1130.000	7.000	2.400
08/04/80	0.005	36.000	20.900	1320.000	12.000	4.100
08/13/80	0.005	28.500	7.600	717.000	12.000	2.700
08/19/80	0.005	22.400	8.100	850.000	14.000	1.800
08/26/80	0.005	64.000	14.000	763.000	5.000	2.800
09/02/80	0.005	32.200	8.100	608.000	9.000	2.300
09/08/80	0.005	31.000	12.400	638.000	12.000	4.000
09/16/80	0.008	38.000	5.500	554.000	2.000	2.000
09/22/80	0.005	32.000	14.500	363.000	11.000	2.900

APPENDIX B (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM J.T. BAKER SECURE LANDFILL

NEW DATA -- PIT 17

DATE	Arsenic mg/l	Magnesium mg/l	Thio-cyanate mg/l	TDS mg/l	TOC mg/l	Potas-sium mg/l
09/29/80	0.019	44.000	11.200	952.000	20.000	4.000
10/06/80	0.057	32.000	9.000	693.000	72.000	6.900
10/13/80	0.206	25.900	16.300	674.000	20.000	3.700
10/20/80	0.136	29.600	25.000	608.000	31.000	0.500
10/27/80	0.078	29.000	9.700	606.000	38.000	2.600
11/03/80	0.203	29.000	11.800	688.000	39.000	2.800
11/10/80	0.164	28.000	12.600	653.000	41.000	2.600
11/17/80	0.116	27.000	13.000	749.000	62.000	4.200
11/24/80	0.079	13.000	15.000	848.000	73.000	8.000
12/01/80	0.281	32.000	10.000	678.000	51.000	8.000
12/09/80	0.125	28.000	21.000	777.000	68.000	6.700
12/15/80	0.203	31.000	12.200	753.000	66.000	8.000
12/22/80	0.097	32.000	9.300	1110.000	81.000	10.000
01/15/81	0.179	31.000	7.500	845.000	75.000	10.000
01/19/81	0.310	29.100	6.400	681.000	82.000	11.400
01/26/81	0.214	30.900	11.800	999.000	74.000	10.900
02/05/81	0.090	25.700	6.600	780.000	72.000	10.500
02/09/81	0.110	25.700	6.700	752.000	72.000	11.500
02/16/81	0.121	25.200	5.600	773.000	73.000	14.000

APPENDIX B (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM J.T. BAKER SECURE LANDFILL

NEW DATA -- PIT 17

DATE	Arsenic mg/l	Magnesium mg/l	Thiocyanate mg/l	TDS mg/l	TOC mg/l	Potassium mg/l
02/23/81	0.167	32.600	12.700	751.000	65.000	15.000
03/02/81	0.107	31.300	5.000	740.000	71.000	14.000
03/16/81	0.043	32.600	3.700	792.000	50.000	13.000
03/23/81	0.041	32.300	3.200	824.000	73.000	18.000

APPENDIX B

(A value shown as 999.000 = no data reported.)

DATA FROM J.T. BAKER SECURE LANDFILL

BACKGROUND DATA — PIT 18

DATE	Arsenic mg/l	Magnesium mg/l	Thio-cyanate mg/l	TDS mg/l	TOC mg/l	Potas-sium mg/l
12/12/79	999.000	18.200	0.060	239.000	21.000	2.100
12/28/79	999.000	999.000	999.000	999.000	999.000	999.000
01/04/80	999.000	18.600	0.200	248.000	9.000	2.100
01/18/80	999.000	19.800	0.400	211.000	19.000	2.100
01/23/80	999.000	23.700	0.200	252.000	22.000	3.200
01/31/80	999.000	25.200	0.200	242.000	12.000	3.100
02/07/80	999.000	21.000	0.100	223.000	18.000	2.200
02/14/80	999.000	22.000	0.100	434.000	10.000	2.300
02/28/80	999.000	21.400	0.100	281.000	10.000	1.200
03/06/80	999.000	23.700	0.100	317.000	12.000	1.900
03/13/80	999.000	16.600	0.200	318.000	8.000	1.000
03/27/80	999.000	26.100	0.100	340.000	9.000	3.100
04/03/80	0.005	25.700	0.300	362.000	8.000	2.100
04/11/80	0.005	24.300	0.100	353.000	5.000	2.300
04/17/80	0.005	22.900	0.100	357.000	7.000	2.500
04/24/80	0.005	27.400	1.800	355.000	7.000	3.100
05/01/80	0.005	28.500	1.400	363.000	7.000	3.100
05/13/80	0.005	28.500	1.700	430.000	10.000	4.500
05/21/80	0.005	28.400	0.200	329.000	7.000	0.300
05/27/80	0.005	30.300	0.100	380.000	6.000	2.100

APPENDIX B (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM J.T. BAKER SECURE LANDFILL

NEW DATA -- PIT 18

DATE	Arsenic mg/l	Magnesium mg/l	Thio-cyanate mg/l	TDS mg/l	TOC mg/l	Potas-sium mg/l
05/27/80	0.005	32.000	0.100	398.000	7.000	2.300
06/04/80	0.005	30.400	0.100	428.000	8.000	2.900
06/09/80	0.006	28.600	0.100	437.000	5.000	2.800
06/16/80	0.005	26.300	0.100	430.000	6.000	2.000
06/23/80	0.005	28.200	0.100	419.000	6.000	2.700
06/30/80	0.005	29.000	0.100	471.000	1.000	3.200
07/11/80	0.005	30.200	1.500	353.000	1.000	2.600
07/14/80	0.005	32.000	0.900	436.000	1.000	2.700
07/28/80	0.007	25.600	1.300	666.000	6.000	3.300
08/04/80	0.005	31.400	1.700	508.000	6.000	2.700
08/13/80	0.005	26.200	0.100	442.000	26.000	1.600
08/19/80	0.005	23.800	0.100	534.000	20.000	0.900
08/26/80	0.005	57.000	0.100	413.000	6.000	3.200
09/02/80	0.005	30.000	0.100	409.000	2.000	1.500
09/08/80	0.005	5.200	17.700	626.000	12.000	10.000
09/16/80	0.005	34.000	0.100	319.000	4.000	1.700
09/22/80	0.016	31.000	0.100	422.000	3.000	6.200
09/29/80	0.012	43.000	0.200	464.000	11.000	3.000

APPENDIX B (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM J.T. BAKER SECURE LANDFILL

NEW DATA — PIT 18

DATE	Arsenic mg/l	Magnesium mg/l	Thio-cyanate mg/l	TDS mg/l	TOC mg/l	Potas-sium mg/l
10/06/80	1.230	31.000	1.500	514.000	67.000	2.700
10/13/80	0.890	25.600	1.600	490.000	5.000	2.600
10/20/80	0.250	29.400	0.100	413.000	9.000	1.300
10/27/80	0.960	29.100	0.200	401.000	7.000	1.100
11/03/80	0.730	30.000	0.100	361.000	8.000	2.100
11/10/80	0.620	30.000	0.100	392.000	4.000	1.300
11/17/80	0.970	28.000	1.000	431.000	8.000	2.200
11/24/80	0.830	13.000	1.000	467.000	9.000	1.900
12/01/80	0.340	32.000	0.100	387.000	8.000	1.500
12/09/80	0.170	36.000	0.300	707.000	8.000	1.400
12/15/80	1.370	30.000	0.100	340.000	8.000	2.000
12/22/80	0.580	31.000	0.100	756.000	10.000	1.600
01/15/81	0.760	29.000	0.100	358.000	8.000	1.700
01/19/81	0.430	28.300	0.100	392.000	10.000	1.800
01/26/81	0.290	30.800	0.100	999.000	8.000	1.400
02/05/81	0.480	24.400	0.600	385.000	30.000	0.900
02/09/81	0.490	25.000	6.700	405.000	72.000	1.300
02/16/81	1.336	25.200	0.600	401.000	17.000	1.800
02/23/81	0.687	30.400	1.100	343.000	15.000	2.200

APPENDIX B (CONTINUED)

(A value shown as 999.000 = no data reported.)

DATA FROM J.T. BAKER SECURE LANDFILL

NEW DATA -- PIT 18

DATE	Arsenic mg/l	Magnesium mg/l	Thio-cyanate mg/l	TDS mg/l	TOC mg/l	Potas-sium mg/l
03/02/81	0.784	29.000	9.300	435.000	5.000	2.000
03/16/81	0.134	31.900	0.500	466.000	4.000	0.200
03/23/81	0.440	29.900	0.800	413.000	11.000	2.800

PERFORMANCE DIFFICULTIES OF "SECURE" LANDFILLS FOR CHEMICAL WASTE AND AVAILABLE MITIGATION MEASURES

PETER N. SKINNER, P.E.*

October, 1980

American Society of Civil Engineers

I. Introduction

Some people have called them "clay barges, laden with chemicals, floating on a sea of groundwater", "inverted mud huts" and "extremely carefully designed and constructed land disposal vaults."

Regardless of what you call them, they are the dominant chemical waste disposal method in use in the Northeast and perhaps the whole United States as well. Although the USEPA considers this method the least appropriate for the disposal of hazardous waste, generators and waste management companies are rushing to State agencies for permits to construct even more of these controversial special dumps.

New York State has had unique experience with "secure" landfills. Hooker Chemical Company began dumping chemical waste at Love Canal in Niagara Falls during the late 1940s. Some 30 years later President Carter declared the area the nation's first industrial "disaster area" due to migration of chemicals. In 1963, Nuclear Fuel Services, Inc. opened what may have been the nation's first specially designed "secure" landfill at West Valley, New York; intended for the permanent burial of radioactive waste. By 1975, some of the early trenches had filled with infiltration and by 1979, subsidence and high leachate levels dashed optimism about the performance of the later , more modern burial pits.

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* The author is the Professional Environmental Engineer for the New York State Attorney General's Environmental Protection Bureau in Albany, New York. He has been a part of this office, made up of lawyers and technical people, since its inception in 1970. He has managed the technical preparations for the Attorney General in a wide variety of environmental litigation in such areas as beach erosion, water supply management, nuclear waste and decommissioning, plutonium transport and toxic waste management. The views expressed herein do not necessarily represent those held by the New York State Law Department.

In 1972, a new company, Chemtrol, developed the design and construction of the first "secure" landfill for hazardous waste at their facility near Lewiston, New York. Scientific landfill #1, as it was called, and its 5 successors, #s 2-6, have been plagued with problems from subsidence, fires, infiltration, organic phase leachate,large leachate pumping volumes, and persistent erosion. In 1978, Newco Chemical Waste Systems,Inc. closed its first secure landfill in Niagara Falls. As of fall, 1980, Newco's successor, CECOS International, Inc., continues to pump leachate out of the two standpipes.

In spite of these troubles, waste managers continue to apply for and receive permits from the New York State Department of Environmental Conservation for "secure" landfills . Trading on the nation's new concern about clandestine waste dumping, and the heightened concern about long-term strict liability for toxic waste, applicants justify their landfills on the basis of improved designs, materials and stricter maintenance, spill control and contingency programs. Administrative hearings drag out for many months, picking away at valid areas of public concern. In spite of their full participation, the public in the affected area becomes even more disgusted with government and prone to civil disobedience and lawlessness. While costs for landfilling sky rocket, forward thinking leaders evaluate acceptable alternatives to "secure" landfills. New York's toxic waste management woes can provide guidance to enlightened States just now formulating their policies toward this most pressing problem. This paper explores these difficulties in terms of state-of-the-art "secure" landfill design and operation and mitigation measures available to enhance long-term isolation of toxic waste in such facilities

II. The "Secure"Landfill in New York State

Introduction

Since Hooker began dumping at Love Canal in the late 1940s, the design and operation of dumps for toxic wastes have been evolving, first from pits in supposedly low permeability soil deposits to the complex multi-layered and internally divided landfills of today.. Many names have been applied to these dumps. Chemtrol calls them "scientific landfills" and "secured landfills"; CECOS International,Inc. (successor to Newco Chemical Waste Services) called them "secure chemical management facilities". A recent SCA Chemical Waste Services, Inc. pamphlet states that these landfills provide "permanent storage"for chemicals. This paper first addresses the question of the degree of proof presently available to determine the performance characteristics of modern "secure" landfills and thereby the length of time "permanent" storage may mean.

Nuclear Fuel Services - West Valley, New York

"Secure" landfills were first employed in New York State in 1963 at West Valley to dispose of low-level nuclear waste. Fourteen trenches, approximately 35 feet wide, 20 feet deep, and 600 feet long were eventually excavated, filled, backfilled and capped with local soils by the site operator, Nuclear Fuel Services, Inc.

Although specifically designed for infiltration minimization and leachate collection and removal, levels of trench water increased in some trenches substantially,after the trenches were closed. By March of 1975, radioactive leachate began to seep out from under the caps of trenches 4 and 5.

After a careful engineering assessment was completed by Dames and Moore, Inc., site owners and operators carried out remedial work on the pre-1968 trenches whose soil caps were only 4 feet thick. The balance of trenches with caps between 8 and 10 feet thick were assumed to be operating properly.

Any optimism about the performance of the other trenches was dashed in 1979, however, with the discovery of cracks and holes in the caps of some trenches and "observed infiltration of water" into trenches 11-14, which trenches were only 4-5 years old. The site operator has submitted to NYSDEC a "proposed action plan" to deal with problems at trenches 8-14. Similar difficulties keeping water out of the trenches have troubled other radwaste burial areas in the U.S. in humid areas as well.

SCA Chemical Waste Services, Inc., Model City, New York

Beginning in 1971 Lou Wagner of Chemtrol supervised the design and construction of Scientific Landfill #1. Permits have been granted for seven such landfills on site as follows:

Landfill	Permitting Authority	Permit Dates
SLF #1	Niagara County Health Dept.	11/8/71
SLF #2	Niagara County Health Dept.	11/9/71
SLF #3	Niagara County Health Dept.	9/6/73
SLF #4	NYS Dept. of Env. Cons. (DEC)	11/1/74
SLF #5	NYS Dept. of Env. Cons. (DEC)	7/30/76
SLF #6	NYS Dept. of Env. Cons. (DEC)	2/24/77
SLF #7	NYS Dept. of Env. Cons. (DEC)	9/7/78
SLF #10,11	NYS Dept. of Env. Cons. (DEC)	hearing/1980

By 1978 SCA Chemical Waste Services, Inc. (previously Chemtrol) had closed the first six "secure" landfill on site. Final capping processes and vegetative coverage has not been completed, however, and, as of this writing, still required completion. Design of the first six landfills, located beside one another in a line, varies little, except for SLF's #4 and 5 which feature 2 subcells and SLF #6 which features 3 subcells. All six landfills were built just below the ground surface and just above or below the groundwater elevation. Synthetic membranes and leachate collection systems were installed in all 6 landfills, although the designs and installation practices changed significantly during the period of 1971-1977. No specific gas collection systems were emplaced.

Filling operations varied at the site as well. Drums of waste were craned in place on their side in SLF #1. Although the information is sketchy, it appears that drums were dumped from trucks directly into the later landfills. By SLF #7, however, SCA had fully developed the current practice of upright tight packing of drums.

Although information about backfilling practices for the early landfills is not readily available, it appears that sludge and liquid waste were often placed in the early landfills, including organic solvents and refractory ~~toxic~~ waste. Several major fires erupted during the filling of the early landfills, two of which required outside fire department assistance. These fires required the use of foam and the hosing of tens of thousands of gallons of water into the "secure" landfills. The caps of these landfills are simple soil layers without any slope.

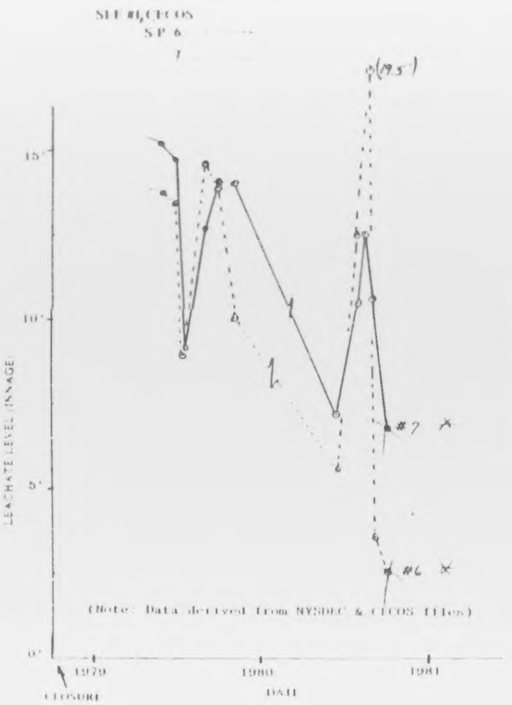
These landfills have not performed well to date. Organic phase leachate, differential settlement, desication cracks and erosion leading to infiltration and high leachate levels have plagued some or all these landfills at various times. One barometer of the performance of the "secure" landfills is the level of leachate and the level reduction accomplished by pumping. Figures 1 and 2 depict the leachate levels in several "secure" landfills or their subcells. Under order of the New York State Department of Environmental Conservation, SCA began in 1979 pumping 300,000 gallons per month from these six landfills in an attempt to lower the levels of leachate inside. As of the summer of 1980, however, only SLF #6 subcells responded significantly to this effort.

The landfill problems at SCA could be explained by any one or combination of design, or site-specific hydrogeologic, operational or construction related flaws. SCA witnesses in the DEC Phase II hearing agreed that remedial work is needed for all six of these "secure" landfills, which, as of 1980, were only 3 to 8 years old. SCA provided NYS DEC with an extremely brief description of such work but refused in the hearing to provide cost estimates for this effort. Leachate pumping and leachate treatment alone will be expensive propositions. Although the aqueous phase can be treated in SCA's waste water treatment system, the organic phase material will largely necessitate drumming and alternative disposal due to its percent level concentrations of PCBs. No data or analyses are available to the

FIGURE 1

"SECURE" LANDFILL
LEACHATE LEVEL PERFORMANCE

SLF #1, CECOS INT. INC. (Niagara Falls, NY)



(Note: Data derived from NYSDEC & CECOS files)

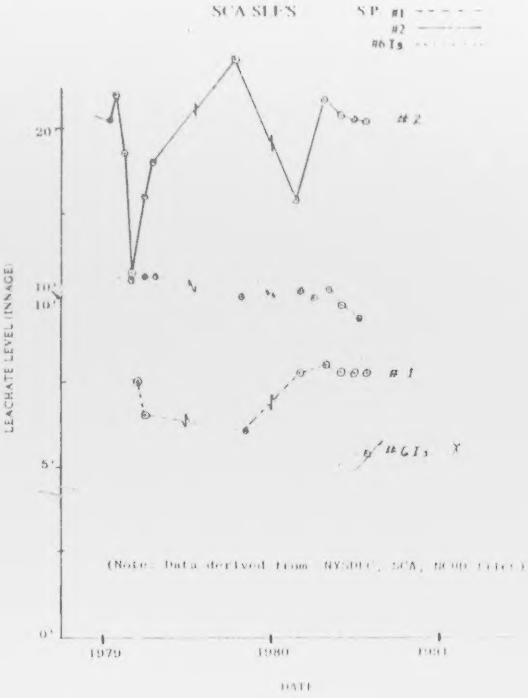
* bad data
P Skinner
phone con
9/23/82

FIGURE 2

"SECURE" LANDFILL
LEACHATE LEVEL PERFORMANCE

Selected "Secure" Landfill Standpipes

SCA CHEMICAL WASTE SERVICES, INC. (Near Lewiston, NY)



(Note: Data derived from NYSDEC, SCA, NCHD files) public to ascertain when leachate production will cease, except for SCA's calculation that 5.431 million gallons of leachate remained in the landfills as of May 10, 1980. More information on these landfills may be available directly from SCA Chemical Waste Services, Inc.

CECOS International, Inc., Niagara Falls, New York

CECOS International, Inc. built and operates 3 "secure" landfills on property owned by W.R.L. Chemical Waste Realty in Niagara Falls, New York. CECOS applied to DEC in 1980 for permits to construct 2 more landfills, #4 and #5, which they call "Secure Chemical Management Facilities" to be emplaced on land owned by Niagara Recycling, Inc. nearby. CECOS also seeks a permit to extend SLF #3 as well. The existing "secure" landfills were permitted and operated as follows:

Landfill	Permitting Authority	Permit Date	Closure Date
SLF #1	NYS DEC	8/19/80	1978
SLF #2	NYS DEC	5/9/80	1979
SLF #3	NYS DEC	3/7/80	active
SLF #3 (extention)	NYS DEC	Application pending	August, 1980
SCMF #4	NYS DEC	Application pending	August, 1980
SCMF #5	NYS DEC	Application pending	August, 1980

The secure landfills #1-3 were somewhat similar, except in size. The design and construction data are presented in Figure 3.

Filling operations for these landfills generally followed the current secure landfill process of upright tight piling of drums, one lift at a time with daily backfill of alkaline material. Bulk waste materials are dumped in the landfills. Some sludges, however, have recently been redirected to the "Secure Sludge Management Facility" nearby which was opened by CECOS in 1979.

Performance evaluations of these two landfills are somewhat premature because they have been closed for such a short time. Leachate removal from the landfills, however, has presented some difficulty to date. Clogged standpipes and inappropriate pumps and piping frustrated early attempts to reduce leachate levels below a maximum of 16 feet. In addition, slow infiltration of leachate into the standpipes resulted in relatively small pumping volumes during numerous pumping cycles. On August 13, 1980, Ms. Lichtenberger, the New York State DEC on-site monitor, measured the leachate levels in the two standpipes in SLF's #1 and #2 and reported the following data:

FIGURE [illegible]

SECURE LANDFILL SPECIFICATIONS [illegible]

		SLF#1	SLF#2	SLF#3 (Extension)
Berms (aboveground containment)	Material/thicknesses	Clay Core &Slag Fill	Same	Same
	Internal Slope	1 x 2	Same	Same
	External Slope	1 x 2	Same	Same
	Height at ℄ Peak	609.2	623.24	627
	External Rock Armor	None	None	None
Area at the base	(in acres)	0.7	1.2	1.6
Depth of Excavation	(elevation)	566	566	570
Volume of waste	(in millions of cu. feet)	1.456	3.4	5.54
Groundwater Depth	(elevation)	567-569	Same	Same
Closure Date		July/78	March/79	?/81
Inner Liner (next to the buried waste)	Material	1 to 1 Clay	Same	Same
	In-situ Permeability	Compacted	Same	Same
	Thickness	2 feet	Same	Same
Synthetic Membrane	Material	Hypalon	Same	Same
	Thickness	30 Mil.	Same	Same
	Permeability			
Outerliner (reworked soil between native soil and the membrane)	Material	1 to 1 Clay	Same	Same
	In-situ Permeability	1 x 10-7	Same	Same
	Thickness	5 feet	5 feet	10 feet
	Additional Layer(s) (Native clay in place)	5 feet at 1 x 10-5 cm/sec	Same	
Tell Tale Layer (warns of infiltration or exfiltration)	Material	None	None	None
	In-situ Permeability	↓	↓	↓
	Thickness	↓	↓	↓
Subcells	Number	2 (Partial)	3	5
	Double Secure Cells	None	None	
Gas Collection System	Internal Layout	4" Poly Pipe	Same	Same
	Treatment		Clay Pipe	[illegible] Pipe
Leachate Collection System	Internal Layout Standpipes (Vert. Concrete)	2	6	10
	Underdrains		#3 Stone	#3 Stone
	Mid-level drains	None	None	None
Cap (Outside to Inside)	Vegetation #1	Rye&Bluegrass	Same	Same
	Topsoil Layer #2	6 Inches	Same	Same
	Unconsolidated Laye. #3	18 inches	Same	Same
	Impervious Layer #4	3' Clay@ 1x10-7 cm/sec	Same	Same
	Synthetic Membrane #5	6 mil Poly	Same	20 Mil. HDPE
	Pervious Drain Layer #6	1' sand	Same	None
	Synthetic Membrane #7	6 mil Poly.	Same	None
	Base Layer #8	1' clay	1' clay	

Note: Blanks indicate lack of information

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Leachate Levels at CECOS Int. Inc.
Niagara Falls, N.Y. (August 13, 1980)

SLF	Standpipe	Level in Morning (ft.)	Level in Afternoon (ft.)	Volume * Pumped (gallons)
1	6	2.1	3.5	5400
	7	6.3	10.6	
2	45	20.4	12.6	3920
	45A	20.1	10.3	
	46	19.7	16.5	
	46A	20.1	16.9	
	47	20.5	20.9	
	47A	19.4	20.6	*from CECOS

These data demonstrate that the leachate levels fluctuate significantly over time in response to pumping and recharge rates. Interpretation of late 1980 data indicates CECOS has been able to reduce leachate levels in SLF #1 and #2 to acceptably low levels after each day's pumping. If recharge to the standpipes is slow because of the limited transmissivity of the fill, dewatering of the landfill will be a long-term project and the leachate extraction and treatment costs an ongoing liability

Pumpage from SLF #1 and SLF #2 is indicated below. CECOS has undertaken analyses to determine the total volume of extractable leachate in these two landfills and is analysing the recharge rate which can be expected in standpipes in their landfills. These analyses may help CECOS more accurately determine the schedule of costs post-closure care will require.

Leachate Pumped (gallons)

SLF	Estimated Leachate Extraction	Closure to 7/1/80	August 1980	September 1980	October 1980	Total
#1	430,000 gallons (as of closure, July '78)	only indirect data available	92,700	126,920	[illegible]	[illegible]
			3,090/day*	4,094/day	[illegible]	
#2	1,730,000 gallons (as of closure, March '79)	only indirect data available	111,371	219,559	146,304	[illegible]
			3,729/day	7,083/day	9,7[illegible]/day	

*Average daily pumpage reflects increasingly effective pumping efforts by [illegible]

Based on initial leachate estimates, CECOS estimated the costs of post-closure care as part of their requirements under the NYSDEC facility permit in the early part of 1980. The following table sets forth their estimate of these costs.

POST-CLOSURE COMBINED MONITORING AND MAINTENANCE COST (in 1980 dollars)

OPERATION	1980	1981	1982	1983	1984	1985	1986-1999	2000	2001
100,430 Secure Landfill #1	19,700	19,700	13,700	11,700	6,170	1,964	1,964	--	--
236,000 Secure Landfill #2	50,900	44,700	32,900	23,900	20,900	8,500	3,600	3,600	--
281,507 Secure Landfill #3	--	37,100	64,100	52,100	40,100	13,651	4,966	4,966	4,966
55,104 Secure Landfill Area	4,592	4,592	2,296	2,296	2,296	2,296	2,296	2,296	2,296

These estimates cover the costs of carrying out a monitoring program for all three sites, leachate collection and treatment, treatment facility replacement, and a limited maintenance program for the sites. However, the estimate considers neither the impacts of contingencies such as deterioration of the cap and the resultant leachate it might create nor was the estimate keyed to inflation or earning power of the escrow fund containing the money for post-closure care.

Based on a post-closure water balance analysis, CECOS estimated infiltration to the landfill after closure. This estimate was based on percolation through the soil cover and took no credit for the 2-6 mil polyethylene layers, the 1 foot of clay beneath, or the effect of the sand drain on directing percolation away from the waste. The calculation also did not consider the impact of erosional or other impacts on the caps' integrity. On these bases CECOS estimated that maximum infiltration into the waste would be 2000 gallons of water per acre of cap per year for "secure" landfills # 1-3.

In addition to this analysis, CECOS projected leachate collection from the landfills as follows:

Year	SLF #1	SLF #2	SLF #3
1980	180,000	480,000	
1981	180,000	420,000	280,000
1982	120,000	300,000	600,000
1983	100,000	210,000	480,000
1984	44,732	180,000	360,000
1985	2,640*	56,000	95,510
1986	2,640*	7,022*	8,660*
2000			
2001			

*derived from "hypothetical" infiltration rate into the landfill of 2000 gal acre/yr

CECOS has recently projected leachate production from their new landfills, SCMF #4, #5. CECOS is particularly optimistic here, projecting that leachate levels will stabilize only one year after closure. After that time, leachate production will not exceed the infiltration rate of 2000 gallons/year/acre of cap. Neither CECOS document projecting leachate production from "secure"landfills, however, provide the bases for the estimate they present. Presumably such bases are under development.

Interpretation of Landfill Performance Data

The design, operation, age and hydrogeologyof the three "secure" landfill sites in New York State differ greatly and thereby limit the scope of conclusions one can reach based on the data presented herein. There are similarities, however. All the landfills were designed and constructed with the purpose of permanent and inexpensive isolation of toxic waste as the primary goals. Considering these goals and the documented occurrence of cap deterioration, high leachate levels and premature remedial work, one can conclude that the "secure" landfill in New York State, built before 1978, has not successfully met its objective.

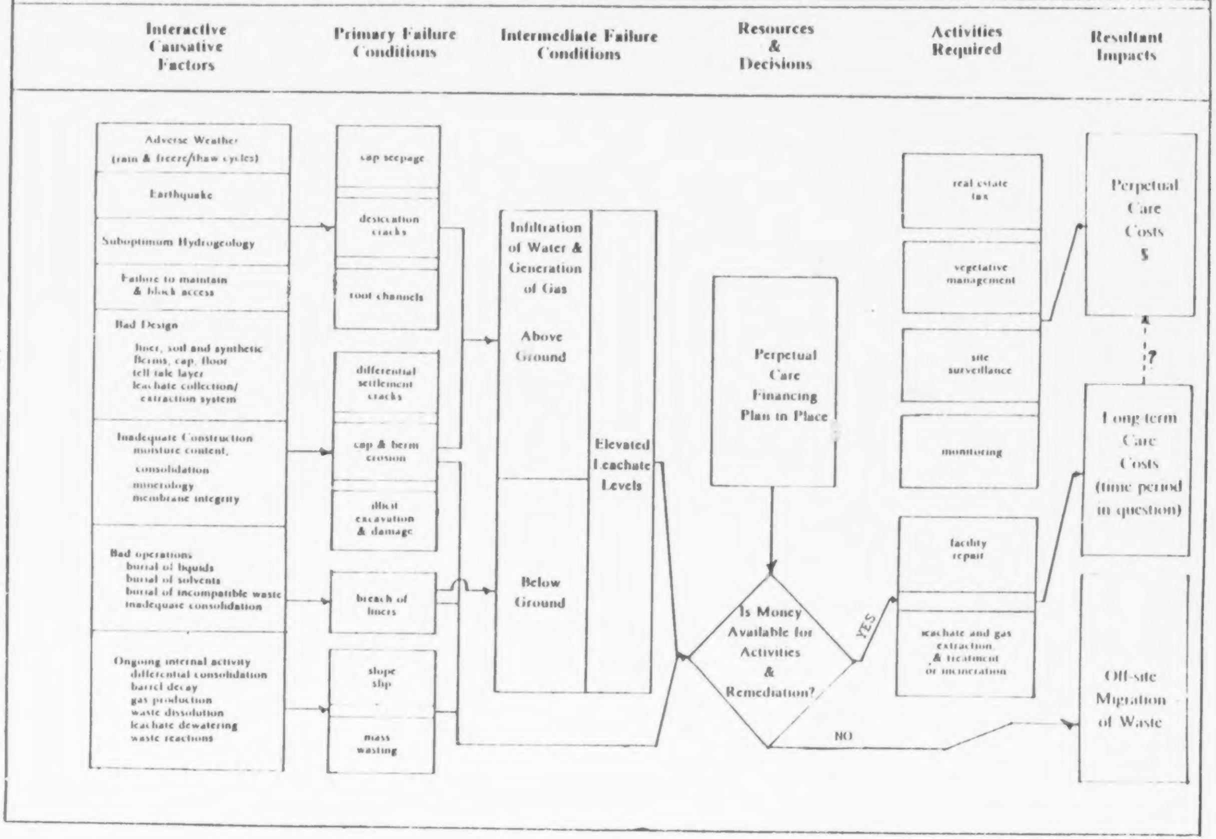
These data can be evaluated from several points of view. A pessimist could conclude that the practice of direct landfilling of chemical waste has a demonstrated track record of failure and the newer landfills will fail as well, only at a later date. The optimist might conclude that new design,construction and operational methods will eliminate the difficulties of the past. If, however, this disposal method becomes widespread across the nation, no one can argue that some proof of success is needed to justify the claims of the optimist. Such proof, though, will be forthcoming in the years and decades to come. Review of new design and construction methods provide some clues to the future performance of today's state-of-the-art "secure" landfills.

III. Considerations for Today's "Secure" Landfill

Introduction

The evolution of landfill design and construction and operational methods has accelerated greatly during the last several years. Motivated by intense public and regulatory scrutiny and the recognition that earlier landfill designs were not performing adequately, waste disposal operators have modified "secure" landfill designs in attempts to mitigate the problems observed in the past. This part of the paper explores the appropriate design criteria for "secure" landfills, factors in the environment, in construction methods, in maintenance programs, and inside the buried waste which can act alone or interact with one another to create both immediate and long term problems. Figure 4 sets forth in graphic form these considerations as well as the ramifications which flow from the actions of these factors.

SECURE LANDFILL PERFORMANCE CONSIDERATIONS FIGURE 4



Performance Goals

Before embarking on the design of any engineering project, good practice requires the determination and exposition of discrete and detailed design criteria. Such criteria are often developed by technical institutes or colloguia of scientists. Many times generic criteria are developed by governmental agencies charged with the protection of the public in a particular area.

In the area of the "secure" landfill, evolution of the design has overtaken the process of setting goals by which one can measure the success of a particular design. Without such guidance, designers have only their experience and good judgment on which to rely. The lack of such criteria and the lack of long-term experience with such landfills may partially explain the performance difficulties with designs to date.

Waste to be Disposed

Prior to the development of design criteria for any waste management project, engineers necessitate an accurate characterization of the waste to be managed. For today's "secure" landfills, this waste includes a large variety of chemical wastes not amenable to waste-water treatment and solvent recovery. In New York State, certain hard pesticides and other toxic materials including PCB's are restricted. Waivers, however, are available from NYSDEC for many of these and are generally granted. Few materials,if any, end up completely banned from the secure landfill.

The physical form of these wastes also vary. Density, liquid content and containerization is very different from waste to waste. NYSDEC now allows no more than 15% free liquid or air in the waste and/or container. This requirement necessitates the addition of absorbent materials to many bulk wastes and to many drums to effect adequate stabilization. No comprehensive test data exist to quantify the engineering properties of the waste being buried. Design criteria must recognize this information gap.

The biological and chemical hazards of the waste also vary. Some wastes buried today represent known and suspected carcinogens, teratogens, and highly reactive materials including acids, bases, and oxidizing and reducing agents. Solvents also often find their way into the waste, which themselves can enhance the migration potential of other waste.

Degradation of wastes inside "secure" landfills has not been studied. Degradation rates for individual chemicals in various environments have received some scrutiny, but these data are not particularly applicable to the environment in the "secure" landfill. Such reactions necessitate the actions of physical forces capable of causing these reactions to take place. Inside the "secure" landfill, however, few of these forces are available. Sunlight, free oxygen, heat and biota do not exist in any appreciable quantity. Without such ingredients, little degradation, except reactions between incompatible chemicals, can be forecast. Essentially, there is no information to support the thesis that the buried waste will be rendered harmless in the foreseeable future. Design criteria must recognize this all-important characteristic as well.

Candidate Design Guidelines

Given that these wastes may remain toxic indefinitely inside the landfill, design guidelines different than those governing most engineering projects should be utilized. Development of such guidelines has begun in the field of nuclear waste management.

In many cases, nuclear waste is equivalent to chemical waste in terms of its toxicity, long life, lack of natural degradability and migratory potential. After years of consideration and public debate, the federal government has moved to establish criteria to guide development of appropriate schemes for disposal of radioactive waste. The United States Environmental Protection Agency (EPA) has proposed these criteria and guidelines for radwaste:

> . . . .
>
> *Criterion 2* - The fundamental goal for controlling any type of radioactive waste should be complete isolation over its hazardous life time. Controls which are based on institutional functions should not be relied upon for longer than 100 years to provide such isolation; . . . .
>
> *Criterion 3* - Radiation protection requirements for radioactive wastes should be based primarily on an assessment of risk to individuals and populations; . . . .
>
> *Criterion 4* - Any risks due to radioactive waste management or disposal activities should be deemed unacceptable unless it has been justified that the further reduction in risk that could be achieved by more complete isolation is impracticable on the basis of technical and social considerations . . . . Risks to a future generation [that] are greater than those acceptable to the current generation [should be considered unacceptable].
>
> *Criterion 5* - Locations for radioactive waste disposal should be chosen so as to avoid adverse environmental and human health impacts and, wherever practicable, to enhance isolation over time.

> *Criterion 6* - Certain additional procedures and techniques should also be applied to waste disposal systems . . . if use of these additional procedures and techniques provide a net improvement in environmental and public health protection. Among these are:
>
> a. . . . retrievability . . . and
> b. [p]assive methods of communicating to future people the potential hazards . . . of disposed radioactive wastes.

Although not yet promulgated, these criteria form a sensible base from which guidelines and regulations for management of any kind of toxic, long-lived waste can be designed. The lack of such articulated guidelines have hampered the implementation of hazardous waste regulations which would be stringent enough to foreclose the possibility of future environmental and financial difficulties traceable to toxic waste disposal facilities such as "secure" landfills.

Environmental and Facility Factors Causing Isolation Breakdown

Since permanent isolation of these wastes is the stated objective of such "secure" landfills, determination of forces or other activities which can cause a breach of the isolation system is in order. Environmental factors are the primary factors causing isolation breakdown. Rainfall, freeze-thaw cycles and dry weather act on soils on slopes to cause seepage through the cap, erosion, desication cracks,slope slippage and mass wasting. Vegetation growing on the cap can both enhance and degrade isolation of waste. Turf mats retard both sheet and rill erosion.Without constant maintenance on the cap, however, grasses are succeeded by brush and then trees. The roots of such brush and trees insinuate their way through the cap,causing root channels and mass movements when trees are uprooted by storms. Earthquakes with their ground accelerations can cause massive wasting of the cap and berms if design is improper,and settlement of the cap if the waste inside becomes liquified during accelerations. If located in a flood plain, the "secure" landfill becomes a potential source of waterborne toxins because erosion or mass wasting can breach the cap and berms. If located on an aquifer, or porous media, the "secure" landfill can become a source of contaminated ground water if the liner is breached.

Design

The design and construction of "secure" landfills plays a role in the degree of permanent isolation they provide. The thickness, arrangement, minerology and emplacement methods of soil liners will determine the facility's resistence to infiltration of groundwater and exfiltration of leachate.

The inclusion of a tell-tale porous layer beneath the clay and membrane liner can serve as an early warning system to monitor for groundwater and leachate. Multi-layer caps must be specified with adequate degrees of elasticity to provide some protection from cap cracks due to differential settlement. These caps must also minimize infiltration and yet store moisture for a vigorous vegetative cover all summer long.

Side berms for "secure" landfills extending above ground must be designed on the basis of worst case earthquake accelerations, soil moisture contents and internal leachate levels. Stone revetments on berm slope can reduce the likelihood of slope slippage over time under adverse soil moisture conditions.

Leachate and gas collection systems inside the landfill can accelerate the landfill stabilization process and reduce the impact of infiltration through the cap and internal waste reactions. Accessible standpipes and leachate drains will assure that leachate can be readily removed.

Subcells for particular types of wastes considered incompatible with other waste types can provide a degree of protection from fires and internal waste reactions after closure. Various kinds of instrumentation to monitor internal physical/chemical conditions may also be valuable. Figure 5 graphically describes many of the requisite design arrangements.

Construction

Construction methods and strict adherence to plans and specifications can enhance the system's resistance to infiltration of rain and snow melt and exfiltration of leachate. Construction in wet weather and in the winter is likely to cause significant divergence from specifications. In addition, dry, wet and freezing weather can substantially change the properties of the inner soil liner exposed to the elements during the period the landfill is open and unfilled. Certain designs can prevent construction equipment from properly preparing the soil liners. Certain construction practices and liner materials can cause perforation of the synthetic membrane and destruction of the soil liner and leachate collection and extraction facilities.

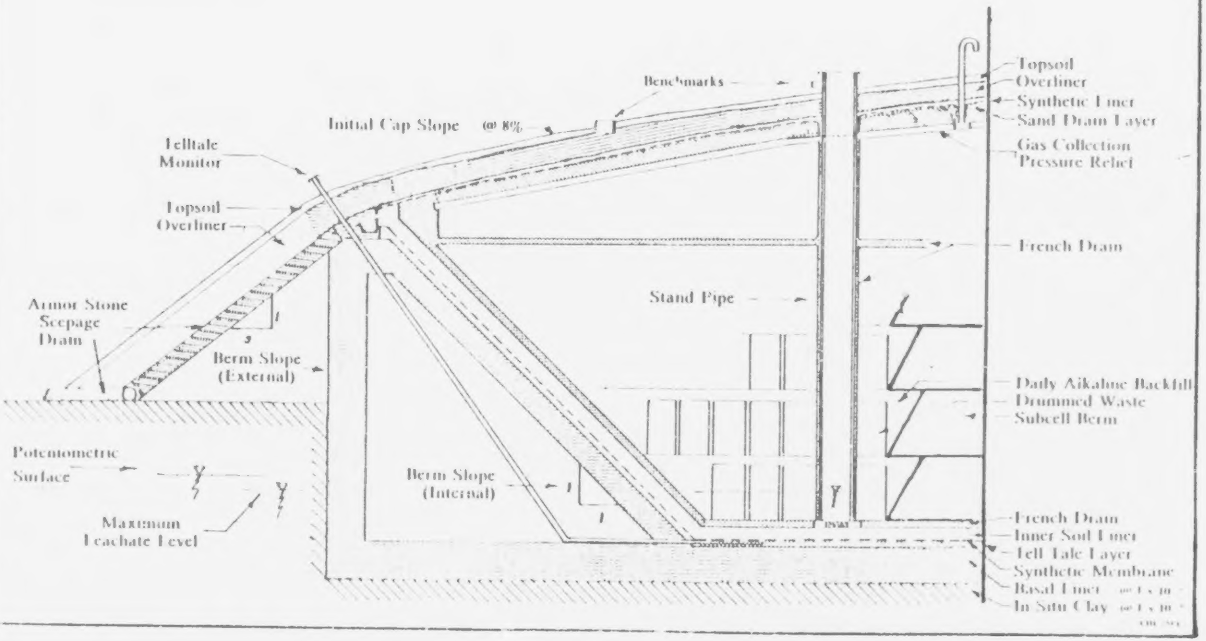
Waste Screening and Emplacement

Prior to emplacement in the landfill, efforts should be made to screen out wastes which are incompatible or unknown. Wastes which necessitate special handling must be handled accordingly. Laboratory wastes and other solvent bearing materials must be given special consideration due to the capability of solvents to enhance migration and degrade soil liners and synthetic membranes.

FIGURE 5.

THE SECURE LANDFILL—1980

All Dimensions and
Material Specifications
are Facility-
Specific unless so noted



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"Secure" landfills are not intended to isolate waste materials because of their structure, but rather their hazard characteristics. Therefore, there are practical limits to the amount of waste which can be screened out on purely structural reasons.

Unfortunately, long term stability of the facility is enhanced by materials which will not compress or deform over time. Efforts can be made to eliminate void space and liquid from buried waste through pre-compaction, in-situ compaction, and stabilization through the addition of absorbent material. Accumulations of leachate inside the landfill during filling should be promptly pumped out.

Backfilling each day with alkaline material, single layers of drums and in-situ compaction by heavy equipment reduce the chance of fire and consolidation after closure, which in turn can cause differential settlement and cap destruction.

Closure Considerations

After the last backfilling is complete, the site operator must emplace the cover expeditiously. Delay allows infiltration of rainwater and contamination of run-off from mounded waste. Proper timing can also improve the coverage and root structure of vegetation planted to retard erosion, especially rapid in the winter and spring.

Certain cover designs are preferable. Covers which respond well to conditions of differential settlement, maintenance of vegetation, gas production, freeze/thaw cycles, and erosion are appropriate. Likewise, covers which can be easily repaired after settlement and erosional incidents are advisable. Particular concern must be paid to the design of the cover near standpipes where settlement can leave openings for infiltration.

Post-Closure Considerations

After the cap is in place, numerous internal and external activities can be expected. Internally, drums and other waste containers will degrade, collapse and cause consolidation of the fill. If properly designed and constructed, drainage systems in the landfill will transmit gases and leachate to collection points for continuous extraction. The extraction of leachate, however, causes consolidation as well. Finally, ongoing reactions of waste materials may also generate gases and liquids which, when removed, will lead to consolidation too.

Consolidation will lead inexorably to settlement of the cap. If this settlement is not consistent across the cap surface, cracks and/or depressions in the surface will occur which can enhance infiltration and require repair.

Of course, after closure is complete, external activities to properly maintain the site begin. Assuming that monitoring nets and baseline groundwater quality parameters have already been established, the groundwater monitoring program must then be implemented, consistent with state and federal permits applicable to the site. Site security must be maintained as well as periodic inspections for settlement, erosion and vegetative difficulties. A program of leachate and gas extraction and treatment is also needed. Regulatory reviews, real estate taxes and post-closure fund management are also necessary site responsibilities. In the event major difficulties are encountered, a program of remedial work must be initiated and paid for as well. Given that the wastes inside remain hazardous indefinitely, these external activities must likewise continue indefinitely.

IV. Shortcomings of Today's "Secure" Landfills

In order to determine whether today's "secure" landfill will successfully isolate toxic waste, we must first focus on a reference design, hydrogeologic setting, waste stream and local climate. I have chosen a modified version based in part on CECOS proposed landfills, SCMF #4 and #5, now undergoing DEC hearings. See Figure #5.

The waste emplaced shall be a mixture of drummed and bulk waste. Drummed waste dumped in the landfill shall not exceed 15% free space or liquid and bulk materials must not exhibit characteristics of a liquid, i.e., to flow. Drums will be placed upright next to one another, one layer at a time, and backfilled with alkaline solids. Each tier will receive some compaction through the backfilling operation and placement of the successive layers. Rainwater accumulations will be pumped out and backfilling will occur daily.

The hydrogeology of the site shall consist of a homogenous deposit of clay at least ten feet below the deepest point of excavation. The potentiometric surface (effectively the groundwater table) in that deposit shall lie about two feet above the bottom of the lowest layer of waste. The location of this landfill shall be in the northeast United States featuring severe winters and hot summers. The following discussion illustrates that, in spite of the best efforts, problems will continue to plague even the most modern "secure" landfill.

Construction Difficulties

First, let us examine whether these reference conditions can be actually achieved, starting with the design. The inner clay liner on the berm walls at a one to two or steeper slope is difficult to maintain in good condition throughout the filling phase of the landfill. As both CECOS and SCA Chemical

Waste Services discovered in 1979 and 1980, desication cracks, high moisture contents and winter construction troubles cause costly damage to clay and the Hypalon synthetic layers already in place. Although the existence of a synthetic membrane directly beneath this layer may have exacerbated the damage, steep walled clay berms represent a difficult design to maintain intact and at optimal moisture content.

CECOS has proposed a solution to this difficulty, namely allowing the synthetic liner to remain exposed, and raising the clay inner liner just ahead of each new lift. Mass slippage may be cured this way, but winter construction will be required. Assuring that each new soil lift meets moisture and compaction specifications will be problemmatical. Maintenance of optimum moisture contents in the connective faces of each lower layer of inner liner will be troublesome or impossible as well, especially in the winter when that face will freeze. The synthetic liner will also be prone to tears from equipment operating on the site.

Clay of the proper type may be impossible or too costly to obtain for the liner system. So called "two to one" clays, such as montmorillonite, make bad candidates for liner systems since their relative volumes, at high and low moisture contents can cause cracking and the possibility of leachate perforation. This is a particular problem for the inner liner exposed to the weather during the filling operation, and fluctuating leachate levels inside. The particular clay minerology can also play a role in the resistance of the inner soil liner to attack by solvents, often dumped in "secure" landfills.

If a synthetic liner is installed, its resistance to common leachates should be assessed. Hypalon and high density polyethylene (HDPE) are two highly regarded types. HDPE is more resistant to organic chemicals often dumped in these landfills and has better elongation-to-break characteristics. HDPE, however, provides less frictional resistance to soil slippage on berms and is more costly than Hypalon.

All clay liners must be emplaced under a strict protocol for construction with the employment of diligent inspection and up-to-date testing equipment. Difficulties are almost inevitable here as well. Rainy or freezing weather may necessitate later reconstruction. Proper compaction and maintenance of moisture content on steep walled berm slopes can be particularly troublesome.

Operational Method Difficulties

Carefully considered and diligently implemented landfill filling operations can reduce the occurrence of fires, post-closure consolidation, leachate production and chemical reactions. Each of these occurrences can create the need for expensive remedial work and ongoing post-closure care. The first line of defense is accurate waste stream characterization. Knowledge about wastes received from a generator can be enhanced by on-site laboratory analysis and in-depth monitoring. As of now, however, this characterization process is rarely carried out on a drum by drum basis. Trust in the generator's truthfulness has been used to justify less than complete waste material description. Consequently, wastes whose physical and chemical properties which are unknown and may not comply with the subcell's requirements are buried.

The degree of compaction afforded drummed waste is variable and unquantifiable. In order to assure compaction of soil in landfill liners, site operators carefully devise and implement moisture content, density and machine operation protocols. Similar compaction of waste is impossible because of the variation in structural strength of waste. The 15% air or liquid allowance in drums further exacerbates this difficulty as does post-closure decay of a tier of 55 gallon metal drums. The density and compressibility of each waste can vary as well. The space between barrels may not get filled with backfill material, allowing voids to form. Winter conditions, creating frozen soil and wastes, will frustrate pre-closure compaction efforts and assiduous observance of the 15% free liquid limit. In short, the many unknowns about dumped waste and the unavoidable problems of winter serve to assure compaction prior to closure inside the landfill will be variable at best.

A part of the above problem stems from waste exhibiting high levels of liquid or characteristics of sludges. A large amount of wastes needing disposal in landfills exhibits these characteristics. Site operator efforts to absorb liquid in "Speedi-Dri" materials vary. SCA Chemical Waste Services utilizes a flow criterion of the consistency of honey to determine the need for further solidification. Honey, however, can hardly be considered a structurally sound material. The operator's efforts to solidify liquids in drums depends on his willingness to check for liquids in each drum and laboriously pour "Speedi-Dri" in each bung hole. Drums with liquids frozen from winter conditions necessitate operation of warming huts to unfreeze the whole drum. Since unfreezing a drum would take many hours and since many drums are delivered daily for burial, it is unlikely most waste site operators will bother to fully observe the liquid content limits.

The placement of bulk contaminated sludges in "secure" landfills is often necessary. These materials originate from tank bottoms, lagoons and other manufacturing processes. Possessing little structural strength and resistant to deliquifaction, these materials can lead to long-term consolidation and settlement as tightly bound liquids escape to the leachate collection system. If dumped near the top of a "secure" landfill, they can interfere with capping and the long-term integrity of the cap. Stabilization with "Speedi-Dry" materials is very difficult to do and leads to a large increase in the required volume of expensive space in the landfill. Consequently, complete stabilization is rarely achieved.

Burial of solvents in landfills is prohibited in New York State but impossible to eliminate. Solvents have been shown to rapidly degrade some synthetic liners and to destroy the integrity of the soil liner matrix. Non-polar solvents migrate in soils at rates similar to water and can solubilize and carry toxic organic wastes, such as PCB's, which normally would remain with the waste mass.

Efforts to prevent burial of solvents are frustrated by wastes whose mixture includes solvents needing disposal. Packaged lab chemicals, which arrive in barrels, can contain up to 25 gallons of solvents in small containers, too small for affordable decanting and proper management. Finally, the 15% free liquid rule allows a significant quantity of such solvents to enter the landfill legally. In short, eliminating burial of solvents in "secure" landfills will be nearly impossible.

Landfill fires are a real possibility in spite of efforts to segregate incompatible wastes. Efforts to extinguish fires lead to large amounts of leachate and to poorly compacted areas in the fill. Although the likelihood and the extent of fires can be reduced by good management, the possibility of fires cannot be eliminated.

Post-Closure Difficulties

The maintenance, monitoring, site security and other responsibilities of post-closure care have several things in common; they are perpetual in nature, potentially costly and exacerbated by problems which preceded the post-closure period. These responsibilities should be borne by the creator of the landfill. These companies, however, cannot be expected to be in business for the entire period over which the landfills are expected to need care. Perpetual care financial arrangements to take the place of such companies in the event of dissolution are likewise difficult to construct; the future costs, the earning power of trust funds and inflation cannot be predicted. Consequently, protection of the public from landfills is likely to require state or federal management at some finite moment in the future.

Deterioration of the security of the landfill due to the external forces of weather and erosion has been discussed. Deterioration of security due to internal activities needs further explanation. Consolidation of the fill inside, leading to differential settlement of the cap, is one such concern.

The rate and degree of consolidation and settlement are a function of the following characteristics of the fill:

1. saturation condition
2. void ratio
3. transmissivity of the fill
4. flow path length
5. in-place compaction
6. fluid viscosity
7. standpipe drawdown efforts

Only some of these parameters can be quantified by the facility operator. For instance, saturation can be assumed to be 100%, the flow path length measured to underdrains, fluid viscosity can be assumed to be equal to water and the standpipes' drawdown level assumed to be constantly near the bottom. The operator cannot quantify with assurance, however, the void ratio, fill transmissivity and in-place compaction. Waste material variability makes quantification of these parameters even more difficult. Since the lack of information precludes projection of consolidation characteristics, predictions of "secure" landfill performance over the long term is likewise impossible.

In addition to the unknowns of general consolidation, uneven settlement can plague landfill caps. Differential settlement can be caused by uneven consolidation of the waste mass due to differences in the compressibility of buried waste and differences between the compressibility of internal subcell walls and buried waste. This differing compressibility may manifest itself in shear failure on the cap. Settlement of the cap in the vicinity of the relatively stable standpipes may shear hydraulic barriers between the standpipes and the cap as well.

V. "Secure"Landfills-Summary,Mitigation and Conclusion

The degree of isolation over time afforded by the "secure" landfill is dependent on the local hydrogeology, design and material considerations, emplacement techniques and long-term maintenance efforts as discussed before. This paper sets forth the limitations inherent in the system and the likely ramifications. Figure 4 sets forth in diagrammatic form these ramifications and puts into perspective the problems of security in landfilling toxic waste.

The Breach of Security

The series of interconnected boxes to the left of the diagram describes the factors which lead to primary failure conditions which include settlement cracks, erosion, internal breakthrough of groundwater and other routes by which water can get in to form leachate and/or waste can escape into run-off from the site or into groundwater.

These primary failure conditions manifest themselves in elevated levels of leachate, gas production and in the extreme, contaminated run-off, mass movement and leachate plumes in the groundwater. If money is available to correct or control these failure conditions, repair and leachate and gas treatment will go forward. If not, the waste will migrate off-site and most likely cause significant adverse impacts on the environment.

These failures can be predicted with certainty if continuing site maintenance, security and occasional repair is neglected. They are the result of such natural forces as weather, earthquakes and internal activities. All these will occur with regularity or on occasion.

Mitigation of Impacts

Since the environmental impacts from a breach in a landfill can be severe, perpetual care arrangements are required to protect the public. Some costs of post-closure care are clearly perpetual. These include vegetative management, site security, monitoring and some sort of property tax payments. Recurring costs include money for facility repair and leachate and gas extraction and treatment. Financial arrangements for contingencies such as earthquake damage repair, cap replacement, groundwater and surface water decontamination and even eventual excavation and waste destruction may be advisable as well. There are, of course, no substitute for the strongest efforts toward proper siting, design, construction, waste emplacement and closure.

Conclusion

There is no question hazardous waste will continue to be generated and necessitate disposal. even with the strongest efforts at waste reduction at the factory. Numerous engineering systems are presently available to facilitate hazardous waste disposal. The "secure" landfill is only one of these waste disposal options which also include incineration and fixation; the latter clearly provide a far more permanent solution to many toxic organic and inorganic wastes. Use of an optimal mix of disposal strategies can significantly reduce the quantities of waste bound for "secure" landfills.

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11. U.S. Department of Energy, Western New York Nuclear Service Center Study, Final Report for Public Comment, November 1978, Washington, D.C., TID-28905-1.

12. U.S. EPA, Summary Rep. of The Low-Level Radioactive Waste Burial Site, West Valley, N.Y. (1963-1975)(1977).

I wish to express special thanks to the staff of CECOS International, Inc. who provided criticisms and additional data to me in the refinement of this paper. Their cooperation and assistance are greatly appreciated. The observations contained herein may not, however, represent their opinions.

Mr. SCHEUER. Mr. Carney. I thought we would ask Mr. Sanjour a question or two and then move on to the other witnesses.

Mr. CARNEY. Will EPA have a chance to testify at this hearing?

Mr. SCHEUER. Yes. Mr. Sanjour is of course testifying for EPA.

Mr. SANJOUR. No, sir, I am testifying on my own behalf.

Mr. CARNEY. In the first paragraph it says——

Mr. SCHEUER. On the second day of hearings, on December 8, we will be hearing from Ms. Rita Lavelle, Assistant Administrator of the Office of Solid Waste and Emergency Response of the EPA.

Mr. CARNEY. Thank you, Mr. Chairman.

How long have you been with EPA, sir?

Mr. SANJOUR. About 10 years.

Mr. CARNEY. Have they always been as you termed them third-class political appointees?

Mr. SANJOUR. I would say at first they were not. Bill Ruckelshaus was certainly first class.

Mr. CARNEY. The hazardous waste regulations are part of an act passed, the Resource Conservation and Recovery Act of 1976. It took an awful long time to get any type of regulation on landfill. Why would you suggest that it was three administrations before we could get any type of regulation?

Mr. SANJOUR. Procrastination, basically. The Agency was faced with a very difficult problem in that they knew that landfilling was impossible and unworkable. On the other hand, they knew there was nothing they could do to allow landfilling that would not basically close down most landfills, and most of them are owned by some of the most powerful forces in the Government. They were walking a tightrope of procrastination for years. On the one hand they had a congressional mandate, and on the other hand they had a mandate not to close landfills. They were under court order for years, and even appealed it to a higher court and were thrown out of that court. It was a case of coming out with regulations or being thrown into jail.

Mr. CARNEY. There is no one who wants to see hazardous waste problems solved more than I do. I live on Long Island, and we have a sole-source aquifer, but I do not see what is accomplished by coming in and calling EPA a bunch of third-string political hacks. After that I did not even feel like listening to the rest of your testimony. It seems like you have an ax to grind. I am not sure if you do or do not. I have not had an opportunity to read your testimony fully. Do you have any suggestions, any ways that we can change the process of landfill, any ways that you can take particular types of hazardous waste and dispose of them right now, do we have the state of the art in that area that we can apply right now, and if so, can you give us some suggestions?

Mr. SANJOUR. There are many alternatives available. Chemical treatment, treatment techniques, incineration, waste exchanges, chemical fixation, biological treatment. You are going to have a witness later representing the companies who use these techniques. Basically the existence of landfills prevents these techniques from being used.

Mr. SCHEUER. We have four more witnesses. Do you want to wind it up?

Mr. **Carney**. I will be glad to. That is all the questions. Whatever you suggest, Mr. Chairman.

Mr. **Scheuer**. Let me ask one question, and then we will move ahead with the rest of the witnesses, and after that we will presumably have time to ask some general questions. You conclude your testimony with the statement that we can solve the hazardous waste land disposal issue for all time by requiring that the Administrator of EPA require the safe treatment of hazardous wastes. If and when such alternative technologies are developed, what percentage of all of the hazardous wastes in this country—and I understand there may be in the neighborhood of 50,000 and disposal sites that are contaminated—what percentage of all of them can be rendered nonhazardous by available state-of-the-art technology?

Mr. **Sanjour**. California has estimated that about 75 percent can be rendered nonhazardous, but even that remaining 25 percent can still be chemically fixed so as to greatly reduce its hazard.

Mr. **Scheuer**. Would that be typical for the whole country?

Mr. **Sanjour**. Yes, sir.

Mr. **Scheuer**. So three-quarters of it can be?

Mr. **Sanjour**. I would say all of it. If you include chemical fixation as a treatment technique, I would say all of it.

Mr. **Scheuer**. Your approach would be to have EPA certify the technologies that are effective and then leave it to market forces to make sure that these 50,000 or more——

Mr. **Sanjour**. No, sir, I wouldn't trust it to EPA research, quite frankly. I would let the marketplace themselves be in a position to improve the technology. Let someone come to EPA with a technique saying I have this technique for handling this kind of waste. The Administrator evaluates and certifies that that technique works on that waste, and sometime after that, that waste can no longer be treated by landfilling. I believe that American industry has the technology, the know-how and the investment money to handle this problem, but there is cheap competition from landfilling and so long as the Government continues to subsidize landfilling, the competing technology just can't get established.

Mr. **Scheuer**. Thank you very much, Mr. Sanjour. We will be back to you.

The second witness will be Dr. Kirk W. Brown of Texas A&M University. Dr. Brown, I ask you to take the same 5 or 6 minutes to give us the highlights of your testimony and then we will have a question or two with you and then finish the panel and then come back to all of you.

Dr. **Brown**. Thank you, Mr. Chairman, and members of the committee.

My name is Kirk Brown, professor of Soil Science. I have spent about the last 10 years researching land disposal of hazardous waste working in the area of land treatment and landfilling of hazardous waste. I have been asked today to talk to you about the effectiveness of EPA's program for making liquid wastes in hazardous waste landfills.

Now, traditionally, clay soils have been used to slow the migration of liquids from landfills. Of course, we need to recognize that despite the persistent use of the word impermeable when referring to clay liners, they are, in fact, by nature permeable bodies. The typical standard that has been accepted for impermeable clays would be a permeability of 10 to the minus centimeters per second. That would allow a leak rate of some 90 gallons per acre of landfill per day if it had a very shallow layer of water lying on it. As the layer of liquid or water increased, the flow would increase proportionately. Ninety gallons is 32,000 gallons per acre per year and it is possible that many of our landfills designed would meet present day standards with clay liners, but would, in fact, be leaking at such rates.

I became concerned——

Mr. **Scheuer**. So you don't think clay liners intrinsically are capable of sealing off toxic wastes?

Dr. **Brown**. Not at all. There are certain circumstances where clay liners may work, but particulary where we are looking at the liquid components and organic components of hazardous waste, my research has indicated that, in fact, the organic liquids that were being placed in landfills and in many cases are still being placed there, do in fact alter the physical structure of the clay liner so that the permeability would be 10, 100, or a 1,000 times greater than when measured with water. The permeability with certain organic chemicals alters the characteristics of the clay causing the clay particles to shrink and get closer to each other, so now 90 gallons a day looks like 900 or 9,000 gallons a day as a potential leak rate. This is the reason why many of the landfills have leaked, particularly where wastes were disposed of in barrels that rusted and the organic liquids came in contact with the soil liner and permeated the soil liner.

Mr. **Scheuer**. Do the synthetic liners provide——

Dr. **Brown**. That is where I am going. What happened then is the Agency responded very quickly, moved away from clay liners and began requiring synthetic liners. So once we began to develop a data base on clay liners, and admittedly the data base is only at the extreme end of concentrated organic chemicals, we still have the dilute chemicals to test—as soon as it became evident that clay liners were unsatisfactory, the Agency abandoned clay liners and moved to another technology for which there is an even smaller data base, synthetic liners. They have been used in the past mostly for lining water resources and the data shows that many of these have leaked. Laboratory tests have shown that particularly when we put hazardous waste in contact with these synthetic liners that they deteriorate with time, they crack, there are flaws that occur in the installation and these facilities leak.

There was a study in New Jersey indicating that 3 out of 3 such liners leaked. My own research in which we tested 12 liners after 6 months, we found that 11 of them leaked under field conditions. Such is the technology that the Agency has moved to so that, in fact, what we are attempting to do here apparently is put a Band-Aid over the soil to try to keep these facilities from leaking.

Mr. **Scheuer**. So you don't consider that the synthetic liners will provide any long-term protection?

Dr. **Brown**. No; they have limited use. One study indicated that useful life ranged from 5 to 20 years. We are calling on them to retain materials that will be toxic for 500 or a 1,000 years, so we can't expect them to be effective in retarding movement of chemicals out of these facilities. The options, of course, that are open to us are the ones that were mentioned by the previous speaker, but we need to recognize that while the EPA has now banned the disposal of liquids in landfills, except if they are solidified, mixed with some kind of a fly ash, we still have a lot of liquids going into landfills. Small generators are able to put liquids in landfills, so that, in fact, some of these materials entering the landfills, once that barrel leaks it will be essentially equivalent to pulling the plug on the bottom of the bathtub. So we need to look for ways of keeping organic liquids out of the landfills.

The solidification techniques work for some liquids, but on organic liquids, they work very poorly. The organic liquids build up in the bottom of the landfill as they drain and we are back to the same problem.

The Agency is relying on caps to prevent water from moving in and liners to prevent liquids from moving out. Despite our best efforts, settling in landfills often results in a breach of the cap, so in addition to the liquids entrained in the waste at the time of disposal, we find that water often enters these facilities and intensifies the problem.

There are other approaches. Certainly we need to——

Mr. SCHEUER. Could you begin to wind up your testimony?

Dr. BROWN. Certainly we need to look at the other approaches. One that I think has a lot of possibilities would be to, in fact, attempt above-surface storage of such wastes. We will always have wastes to get rid of, but if we could put them above the surface, utilizing the landfill technology, but instead of allowing this leak to occur underground, cause it to occur on the surface where we could collect it with drainage systems so it could be managed and treated rather than leaking unnoticed into our ground water resources.

Thank you.

[The prepared statement of Dr. Kirk W. Brown follows:]

Kirk W. Brown
Soil Scientist, Texas A&M University

Summary of testimony before the House
Subcommittee on Natural Resources, Agriculture Research
and Environment of the Committee on Science and
Technology

November 30, 1982

Traditionally, either native, undisturbed or compacted clay soils have been relied upon to slow the release of liquids from surface impoundments and landfills. Despite the persistent use of the term "impermeable" when referring to clay liners, they are in fact, permeable. Water movement through saturated clay liners designed to meet the usual accepted permeability of 10^{-7} cm/sec is equivalent to a leakage rate of 90 gal/acre/day or 32,850 gal/acre/year. Thus all clay liners when exposed to a head of liquid will leak.

As the products of our industrialized society have become more complex, so have the wastes. As a result, vast quantities of liquids other than water have been, and continue to be, placed in impoundments and landfills, both as free liquids and as liquids entrapped in sludges. Consequently, my research group began, four years ago, to evaluate the movement of organic liquids through clay soils. The results, from both laboratory and field tests, indicate that concentrated organic liquid-bearing wastes may alter the structure of clay soils, resulting in permeabilities 100 to 1000 times greater than the values measured with water. Thus, a leakage rate of 90 gal/acre/day with water may reach 9,000 to 90,000 gal/acre/day where free organic liquids are disposed. These findings in part were responsible for causing the USEPA to ban liquids from landfills, and in addition, were regrettably partially responsible for the newly instituted regulations requiring flexible membrane liners.

Clay liners had been used for some time without adequate testing. However, as soon as data were developed with concentrated organic liquids, only one end of the spectrum, the Agency abandoned clay liners in favor of flexible membrane liners. Despite horror stories of leaking flexible membrane liners circulating among those in the field, there is yet no compilation of either the successes or failures of this technology. One study, however, indicated that all three flexible membrane lined hazardous waste landfills in New Jersey were leaking. In my own study, 11 out of 12 field cells lined with one type of flexible membrane liner have leaked. Unfortunately, we have no long-term experience with these liners in landfill situations. Some experts suggest that even if flexible membrane liners were properly installed so that they did not leak immediately, they would deteriorate 20, 30 or 40 years later. Thus, the Agency is now asking us to rely upon flexible membrane liners to prevent discharge of dangerous chemicals which may retain their toxicity for centuries.

The Agency has thus shifted from one unproven technology to another in an attempt to prevent landfills from leaking into our groundwater. An alternative approach would be to discourage the use of landfills and encourage the use of techniques that either destroy (incineration), degrade (land treatment), or recycle hazardous wastes. The small volume of wastes untreatable by these alternate techniques could be disposed in above-ground storage units. Placement of solidified or chemically-treated waste in above-ground, gravity drained facilities constructed to provide both chemical and physical security, out of contact with the groundwater, deserves our immediate consideration. It is difficult, however, to get engineers and regulators to consider innovative systems. when the Agency continues to encourage the use of below-ground landfills, even though a large portion of these facilities will require massive cleanup operations in the future.

Kirk W. Brown

Soil Scientist, Texas A&M University

Testimony before the House
Subcommittee on Natural Resources, Agriculture Research
and Environment of the Committee on Science and
Technology

November 30, 1982

In the past, waste was often used to fill unwanted holes including erosion ditches and pits remaining after surface mining activities. The wastes being placed in such facilities in the first part of the century were typically municipal garbarge, construction and demolition wastes. The facilities certainly leaked, since in some cases the waste was dumped directly into the water table, and the leachate was contaminated. For the most part, the contaminants were objectionable but only slightly toxic. As our industrial activities became increasingly more complex, industrial wastes were added to the list of materials being disposed of in such open dumps. Such wastes include pesticides and other biocides, plastics and plasticizers, pharmaceuticals, and toxic metals, which retain their toxicity when exposed to the anerobic acidic environment and are in some cases transformed into even more toxic substances. It soon became apparent that the leachate emanating from such facilities contained toxic constituents which had detrimental effects on human health and the environment. Sawhney _et_ _al_. (1982) reported finding acetone, isoproyl alcohol, tetrahydrofuran, methyl ethyl ketone, dichloromethane, chloroform, benzene, n-butyl alcohol methyl isobutyl alcohol, 1, 2 dichloroethane and several components of gasoline in the leachate from two landfills. Many of these compounds are toxic, and some are known to be mutagenic. Dunlap et al. (1976) also reported finding a wide range of organic compounds in the leachate from a municipal landfill which most likely received industrial waste. They reported finding diethyl phthalate, dioctyl phthalate, cresol, xylene, cyclohexanol, tri-n-butyl phosphate, butyric acid, isobutyric acid, valeric acid, 2-ethylhexanoic acid, isomeric acids, cyclohexanecarboxylic acid, caproic acid, heptanoic acid and some 11 other compounds at concentrations below 1 ppm.

The approach taken to prevent these contaminated leachates from reaching the groundwater was to line the landfills or other facilities with compacted soils. Traditionally, either native, undisturbed or compacted clay soils have been relied upon to slow the release of liquids from surface impoundments and landfills used for waste disposal. Despite the persistent use of the term "impermeable" when referring to clay liners, they are in fact, permeable. Water movement through saturated clay liners designed to meet the usual accepted permeability of 10^{-7} cm/sec (Metry, 1980) is equivalent to a leakage rate of 90 gal/acre/day or 32,850 gal/acre/year when the hydraulic gradient on the liner is 1. This means that these flow rates are achieved when the liner is saturated from top to bottom. If the hydraulic gradient is increased, the flow rate will increase so that when a 2 ft layer of liquid sets on a saturated 2 ft thick clay liner, the flow rate will double to 180 gal/acre/day. If the layer of liquid is 18 ft over a 2 ft thick saturated clay liner, the flow rate will be

900 gal/acre/day and so on. Thus all clay liners when exposed to a head of liquid will leak. One EPA study reported that 75-85% of municipal solid waste disposal sites were leaking, contaminating surface or groundwater. Hazardous waste landfills were also found to be a source of groundwater pollution (EPA, 1978).

The regulatory records of four operating double lined landfills, equipped with leak detection layers and drainage systems between the liners were evaluated by Montague (1981). The 18" soil liner failed and polluted water eight months after installation, and within two years the contaminants began showing up in the groundwater table 50 ft below the surface. The 30 ml Hypalon liner was leaking at between 50 and 124 gal/day two months after inatallation. The leak rate from the 30 mil PVC liner was less, amounting to some 3 gal/day, but it was contaminated with arsenic and thiocynate. A 20 ml PVC liner began to leak within 2 months following installation at rates of between 60 and 131 gal/day. The leachate from this facility included lithium which was added to the waste as a tracer. One could always claim that the facilities for disposing of hazardous waste were poorly engineered or poorly constructed, but the facts remain that all four began leaking significant amounts of contaminated water within only a short time following their installation.

As the products of our industrialized society have become more complex, so have the wastes. As a result, vast quantities of liquids other than water have been, and continue to be, placed in impoundments and landfills, both as free liquids and as liquids entrapped in sludges. Consequently, my research group began four years ago to evaluate the movement of organic liquids through clay soils. The results, from both laboratory and field tests, indicate that concentrated organic liquid-bearing wastes may alter the structure of clay soils, resulting in permeabilities 100 to 1000 times greater than the values measured with water (Anderson and Brown, 1981; Anderson _et al._, 1982; Brown _et al._, 1983). Thus, a leakage rate of 90 gal/acre/day with water may reach 9,000 to 90,000 gal/acre/day where free organic liquids are disposed of in clay lined facilities. These findings in part were responsible for causing the USEPA to ban liquids from landfills, and in addition, were regrettably partially responsible for the newly instituted regulations requiring flexible membrane liners (EPA, 1982).

Clay liners had been used for some time without adequate testing. However, as soon as data were developed with concentrated organic liquids, only one end of the spectrum, the Agency abandoned clay liners in favor of flexible membrane liners for lining disposal facilities (EPA, 1982)

It is regrettable that the Agency so completely abandoned clay as a liner for hazardous waste landfills. Clay liners may be acceptable if the leachate is of such characteristics that it does not adversely impact the permeability of the liner as would be expected with dilute inorganic, and possibly even dilute organic chemicals. Clay liners may also be a viable liner material where a properly designed and managed leachate removal system is provided and assurances can be provided that it will be maintained and the leachate will be removed and disposed of until it reaches acceptable quality. If a small leak rate is acceptable as may be possible for facilities in certain geological settings, then clay liners may also be the best long term option. Careful laboratory and field testing are, however, needed to determine if properly selected and compacted clays provide sufficient protection of the environment for the particular leachate to be retained.

Despite horror stories of leaking flexible membrane liners circulating among those in the field, there is yet no compilation of either the successes or failures of this technology. One study, (Montague, 1979) however, indicated that all three flexible membrane lined hazardous waste landfills in New Jersey were leaking. In my own study, 11 out of 12 field cells lined with one type of flexible membrane liner have leaked. Unfortunately, we have no long-term experience with these liners in landfill situations. Much of the EPA's research programs on the influence of landfill leachate on the properties of flexible membranes has been conducted utilizing leachate from municipal solid waste landfills. The data which spans a period of no more than 56 months (Fong and Haxo, 1981) indicates deterioration of the physical properties of many of the liner materials tested, including swelling and loss of seam strength.

The data base for exposure of flexible membranes to hazardous industrial waste covers only a few of the waste streams and is even shorter in duration than our experiences with municipal waste leachates (Haxo, 1981). Kays (1977) reports that flexible membrane liner failures can be categorized into those resulting from physical, chemical and biological failures. Physical failure mechanisms include punctures which may result from traffic pressure even when the liners are covered (Gunkel, 1981), tears, creep, freeze-thaw cracking, wet-dry cracking, differential settling, thermal stress, differential hydrostatic pressure, abrasion, and failure of seams (Haxo, 1982). Chemical failure results from deterioration resulting from ultraviolet light, ozone, hydrolysis, ionic species attack, extraction, ion species incompatibility, and solvent attack which may dissolve either the plastic or the plasticizer. Biological degradation includes microbial attack, attack by burrowing animals, or as a results of animals trying to escape from inside the facility.

Many failures have been attributed to installation difficulties including seaming difficulties in the field and tears or rips occurring during or shortly after installation. Furthermore, no liner presently on the market can stand up to the full range of chemicals which might be found in a hazardous waste landfill. If the membrane is resistant to acids, it may be destroyed by oils; if it resists polar organics, it may be destroyed by nonpolar organics.

Flexible membrane liners have successfully been used for lining water reserviors. They have been used successfully for retaining hazardous waste in open ponds, where only a set of specified chemicals will come in contact with a carefully selected material, and where constant surveilance and monitoring is possible. Facilities which have functioned well for years have been known to fail quickly if suddenly exposed to other chemicals which they were never intended to retain. Haxo (1980, 1982) after testing twelve flexible membrane liners with a series of hazardous industrial wastes concluded that "there does not appear to be any single lining material now commercially available which is suitable for long-term impoundment of all wastes". He also concluded that despite his laboratory tests, field tests are still needed to develop data which allows extrapolation of laboratory data to the field. The very limited data available on exposed membranes (Haxo, 1982) indicates degeneration of the materials exposed to landfill conditions for 4-9 years. Pacey (1980) suggested that even if flexible membrane liners were properly installed so that they did not leak immediately, they would deteriorate 20, 30 or 40 years later. Pertusa (1980) suggested that seven flexible membrane liners had useful lives of between 5 and 20 years for water impoundments and that the useful lives would likely be reduced when exposed to wastes. Nonetheless, the Agency is now asking us to rely upon flexible membrane liners to prevent discharge of dangerous chemicals which may retain their toxicity for centuries (EPA, 1982).

The requirement set down in 264.301 (EPA, 1982) that the waste be prevented from passing into the liner during the active life of a facilility could obviously not be met for clay liners, and the requirement is going to be difficult if not impossible to meet for flexible membrane liners. Data of Haxo (1981) on 12 liner materials tested with 8 different wastes indicated that the wastes were absorbed in 89 out of 96 test specimens.

By requiring leachate collection systems (264.301 and 264.314) and leak detection systems (264.302), the Agency is admitting that they are not confident that the liners they are requiring do not leak (EPA, 1982).

Solidification of liquid wastes (264.314) will work for certain aqueous solutions or suspensions of inorganic materials and very low concentrations of organic liquids; however, it only works to adsorbed organic liquids. Thus the technique should not be utilized for organic liquids unless it can be fully demonstrated to be effective. Otherwise, the liquids adsorbed on the solids used for stabilization will only drain through capillaries from the solids when they are stacked in the landfill, thus putting a direct head of liquid on the leachate collection system and the liner. Consequently, the EPA's regulations should reduce but will not eliminate free liquids in landfills

The State of New York has had a rule limiting liquids to 15% of the waste being landfilled since the mid 70 and have recently reduced it to 10%. The New York Attorney General's office is presently considering a plan to reduce the permissible limit to 5% and to eventually ban liquids altogether. California has taken steps to ban the disposal of a selected list of liquids from landfills. Their ban will include halogenated organics and PCBs, but they do not go far enough in that they do not exclude all organic liquids.

I am also quite concerned about the lack of control over small quantity generators who can continue to legally dispose of free liquids into landfills. A few barrels of organic liquids may drastically alter the permeability of a landfill liner, essentially pulling the plug from a bath tube and thus allowing contaminated leachate to leak rapidly from the facility. I recognize that steps are being taken to regulate these policies, but during the two years alloted to tighten standards, thousands of barrels of liquid waste will be disposed of in facilities which were not designed as hazardous waste landfills.

The Agency has thus shifted from one unproven technology to another in an attempt to prevent landfills from leaking into our groundwater. An alternative approach would be to discourage the use of the classical landfills and encourage the use of techniques that either destroy (incineration), degrade (land treatment), or recycle hazardous wastes. The small volume of wastes untreatable by these alternate techniques could be disposed in above-ground storage units. Placement of solidified or chemically-treated waste in above-ground, gravity drained facilities constructed to provide both chemical and physical security and out of contact with the groundwater deserves our immediate consideration. It is difficult, however, to get engineers and regulators to consider innovative systems when the Agency continues to encourage the use of below-ground landfills, even though a large portion of these facilities will likely require massive clean up operations in the future.

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Mr. SCHEUER. I think in deference to time, we will move on to the next witness and finish the panel and then have questions for everybody.

We will hear from David Miller, geologist for Geraghty & Miller.

Mr. MILLER. Thank you.

My name is David Miller. I am a professional geologist with the firm of Geraghty & Miller and I have spent about 30 years as a ground water consultant.

Mr. Sanjour has kindly given the rest of my introduction. I have asked today to provide testimony regarding the scientific adequacy of the ground water monitoring aspects of the new hazardous waste regulations, and especially based on the fact that EPA appears to be relying on monitoring as a second line of defense after constructing and operating double-lined and single-lined landfills.

The important thing to remember is that there probably is no other scientific method available to determine whether you have failure at a particular site or not than monitoring. The fact that we do have the state of the art of monitoring, the techniques are available as long as the monitoring programs are constructed correctly and the information is interpreted by competent and trained geologists and engineers.

The hazardous waste regulations call for three levels of ground water monitoring. The first is what is referred to as detection monitoring and it is simply to provide information as to whether a failure has or has not occurred, whether hazardous substances are escaping or not escaping. This type of monitoring relies on comparing background information or supposedly unaltered ground water, where the ground water that may be altered by the facility leaking downstream from the facility. This is not a very difficult type of monitoring to carry out. However, there are some geologic environments where monitoring can be very difficult. The geology is complex, the flow systems are difficult to understand, and, of course, would recommend strongly that hazardous waste sites be kept out of such areas.

The other thing that has to be kept in mind that is very important in detection monitoring is you have to do more, go out and sample some wells. You have to understand the flow system so that minimum programs of one well upstream and a few wells downstream are not very effective.

The second phase of the monitoring program calls for compliance monitoring and here is where you have a nonground water contamination problem and the EPA will then specify a certain constituent and a certain concentration that they don't want exceeded. Here is where we begin to reach the state of the art of the ground water sciences. You can put in the monitoring program, but because here we are really trying to predict and trying to come up with an analysis of risk somewhere downstream of the site, we are exerting on what may be beyond our ability to do. The reason for this is that there are numerous processes that operate in the ground water system. There are all kinds of things that can happen to particular chemicals as they migrate through the ground water.

Mr. **Scheuer**. While you are discussing ground water monitoring, do you agree or disagree with Mr. Sanjour's remarks on the unreliability of current ground water monitoring techniques?

Mr. **Miller**. You cannot characterize monitoring as being unreliable. It depends on the geological environment. If you are in a relatively simple geological environment, monitoring can be reliable. If you construct your wells properly and have placed them in the proper area and you have somebody competent in interpreting the data, that can be reliable. It is how much you push that monitoring system that then becomes a difficult problem. If you try and make long-term predictions as to what is going to happen in some areas, that is very difficult. Does that answer your question?

Mr. **Scheuer**. Yes.

Mr. **Miller**. The third phase of the monitoring program under the hazardous waste regulations is to determine the effectiveness of a cleanup program. Here rather than comment on the monitoring itself, I would just like to comment on the fact that clean up should not be an across-the-board requirement at every site. And that appears to be what the monitoring requirement indicates under the regulations. We simply don't have the money to clean up all the sites around the country where contamination has occurred, and we are going to have to face the fact that we are going to have to write off some acquifier areas that have become badly contaminated. We are going to have to develop criteria on which areas to write off. Monitoring would be appropriate on those areas where contamination has occurred, to determine and define the boundaries of the contamination to protect the potential and existing ground water users.

Finally, I would like to comment on at least one of the daily requirements in the hazardous waste regulations which eliminates the need for monitoring at sites that are double lined. I don't think that any site that receives hazardous waste should be exempt from monitoring both to protect the operator himself against potential liability, and also so that he can determine background and so that if something does occur, whether him or not, and to protect the user.

So in summary, really, again to answer your question, monitoring can be effective. There is no prescribed manner that covers oversight. We can't write that specification or regulation to cover oversight. Ground water is unique from place to place. You have to leave the adequacy of the monitoring up to the disposer, as Mr. Sanjour pointed out, and the regulator. In order to do that, you have to have properly trained personnel. Unfortunately, we probably have only enough properly trained personnel to work on a small percentage of the existing sites where contamination has already occurred.

I would recommend that the training and funding of personnel be something that should be supported on both the Federal and the State level.

[The prepared statement of Mr. Miller follows:]

Geraghty & Miller, Inc.
CONSULTING GROUND-WATER GEOLOGISTS AND HYDROLOGISTS

North Shore Atrium
6800 Jericho Turnpike
Syosset, New York 11791
Cable: WATER
Telephone 516/921-6060

Testimony By: David W. Miller
Before the Subcommittee on Natural Resources,
Agriculture Research and Environment Hearing,
November 30, 1982

My name is David W. Miller and I am a principal in the firm of Geraghty & Miller, Inc., Syosset, New York. I am a professional geologist with over 30 years experience in the ground-water field. My firm conducts studies and investigations throughout the United States and overseas relating to the development, management, and protection of ground-water resources. We provide consulting services to industries, mining companies, public utilities, and government at all levels.

I have been asked today to provide input with regard to the adequacy and scientific validity of the ground-water monitoring and response program required under EPA's hazardous waste land disposal regulations. It is my understanding that the Subcommittee would like me to comment on the degree of immediate and long-term protection this program affords to ground water. Basically, it would appear that EPA is relying on monitoring as a second line of defense, the first being physical containment systems such as single and double liners. I support this concept. In fact, there is no scientific tool available other than a properly constructed and operated monitoring system to protect groundwater quality in the case of failure of the primary containment facility.

Of key importance is the fact that the state-of-the-art of monitoring exists. The drilling, well construction, and sampling techniques available today are adequate to construct effective monitoring systems. There are, of course, certain geologic environments in which monitoring becomes extremely expensive and may not be cost-effectively employed. In order to obtain credible information, dozens of wells and hundreds of ground-water samples may be required to develop an adequate analysis of the hydrogeologic system. Such conditions are common in fractured rock areas and in regions where there are a number of different aquifers present which comprise a complex flow system. Although there are probably a large number of existing land disposal sites already located in such areas, it is my recommendation that no new land disposal facilities, regardless of engineering design, be allowed under these conditions.

The hazardous waste regulations call for three levels of ground-water monitoring. The detection monitoring program is designed simply to provide an early warning that contaminants may be escaping from a land disposal facility. The basis for the determination of failure is a comparison of downgradient water quality with background (upgradient) conditions. This concept is valid as long as cetain characteristics of the site are fully understood. Most importantly, one must have a thorough knowledge of the ground-water flow system. Otherwise, upgradient and downgradient well locations cannot be selected, and a plume of contaminated ground water could easily be missed. Data would be required from more than the minimum number of wells recommended in the existing interim regulations (i.e. one well updip and three wells downdip of the waste disposal facility). In some areas, dozens of wells tapping the aquifer at different depths would be needed to determine the probable direction of contaminant migration from the site. In some situations there may be no single flow direction; flow may alternate seasonally or may radiate from the site.

In determining background water quality for detection monitoring, it must also be taken into consideration that ground-water quality can be quite variable over relatively short periods of time. Quarterly or semiannual sampling might be misleading because of these normal variations. To overcome this condition several years of sampling at more frequent intervals is sometimes required. Another fact is that individual monitoring wells sample relatively minute points in the overall ground-water system. Unlike surface water, ground water does not mix, and contamination follows distinct pathways. Even closely-spaced monitoring wells can yield water of very different qualities depending on whether they are inside or outside of a contamination plume. To protect downgradient water users, monitoring wells must be carefully placed on the basis of a thorough understanding of the flow system. In summary, detection monitoring, as required by EPA's regulations is not fool-proof, but if properly applied can serve as a highly reliable backup system to engineering design.

The second phase of the monitoring program outlined in the hazardous waste regulations consists of compliance monitoring at known ground-water contamination sites. In this case EPA specifies concentrations of chemicals which cannot be exceeded without a cleanup program being implemented. Because the compliance point will probably be located at the edge of the waste disposal area, the concentrations chosen will necessarily be based on the potential threat or risk to ground-water users somewhere downstream of the facility. In other words, compliance parameters will be based on a prediction of concentrations of chemicals at some time in the future and some distance from the site.

Unlike detection monitoring, compliance monitoring with its dependence on predictions of contaminant migration through the subsurface may be beyond the state-of-the-art of the ground-water science. It is not presently possible to determine how thousands of individual chemicals will react in the ground-water environment or to predict the effects of numerous processes such as attenuation, dispersion, and diffusion. A vast amount of field data would be required to develop a reliable basis for such predictions.

It is frequently suggested that modeling could serve as an adequate predictive tool for this prupose. However, even detailed investigations which might cost on the order of $250,000 to $500,000 per site may not supply enough data to develop a model to be used in this capacity. Furthermore, a relatively successful model based on adequate data would yield results only within an order of magnitude of the actual situation. This level of accuracy may not be acceptable when public health is at risk and critical concentrations are measured in parts per billion.

The process of obtaining the data for predicting ground-water conditions, interpreting the information and making accurate decisions to implement compliance monitoring is a highly scientific endeavor. It can be carried out only by well trained ground-water technicians. There is presently a severe shortage of trained ground-water scientists across both public and private sectors. It is doubtful that there would be talent available to work on more than a relatively small percentage of the existing sites that would fall under the compliance monitoring aspects of the new hazardous waste regulations.

The third phase of monitoring under the hazardous waste regulations is directed at measuring the effectiveness of a cleanup program. Cleanup or restoration of the aquifer to a certain level of water quality is a worthwhile goal in critical aquifer areas where there is no opportunity for replacement of water supplies. However, because of the technical difficulties and high cost involved in restoring aquifer systems, cleanup should not be an across-the-board requirement. In other words, not every site where contamination has exceeded certain limits should be automatically slated for cleanup. Restoration costs for a typical plume of contaminated ground water can be tens of millions of dollars and can take decades to achieve. Therefore, the decision to spend money on such an endeavor should be based on carefully thought out and applied criteria. In those areas where cleanup is not justified, the contaminated aquifer area will have to be written off. Under these conditions, monitoring would be more appropriately applied to define the boundaries of that portion of the ground-water system which can no longer be used for water-supply purposes.

In conclusion, I would like to comment on some of the detailed requirements of the hazardous waste regulations. I do not support the provision that monitoring is not required at hazardous waste facilities which are constructed with double liners. No liner system can every be guaranteed as leak proof. In fact, some chemicals, particularly synthetic organics, are suspected of breaking down natural and man-made liner materials. Furthermore, hazardous wastes are unloaded, handled and probably temporarily stored at the site prior to final disposal. These and other activities are important potential secondary sources of ground-water contamination whose impact must be monitored. Monitoring is also necessary to establish groundwater flow and background water quality data for the site to be used as a baseline in the event that the double liner system fails.

A second specific comment I would like to make is directed at the regulatory requirement that monitoring programs are initially to be installed only in the uppermost aquifer. This may be dangerous, especially in recharge areas where there is downward vertical movement of ground water. In such a situation, monitoring wells placed at the waste area boundary might not intercept contaminants because they are moving directly into the underlying artesian aquifers. Again, as in the case of all monitoring before the final program at any particular site is approved there must be developed a thorough understanding of the ground-water flow system on a three-dimensional basis. The regulations should be flexible enough to allow for site-specific monitoring design modifications.

Mr. SCHEUER. Thank you very much.

For our last witness, Dr. Joel S. Hirschhorn, Project Director of the Hazardous Waste Assessment Program of the Office of Technology Assessment.

Dr. HIRSCHHORN. Thank you, Mr. Chairman.

With me is Dr. Suellen Pirages, senior analyst on this project. Our comments are meant to be summaries of more detailed analysis contained in the final report to Congress entitled, "Technologies and Management Strategies for Hazardous Waste," which we expect to issue next year.

I will talk about two areas, pick up on them here, the monitoring requirements under the land disposal regulations and then talk about something new, perhaps what might be——

Mr. SCHEUER. Excuse me, Doctor. I think some of the people might be having a hard time hearing you in the rear.

Dr. HIRSCHHORN. The second area that I will talk about might be EPA's response to some of the criticism we have been hearing today, which is its use of the risk/cost policy model.

First, about the monitoring requirements, we believe that the current regulations for monitoring RCRA facilities are inadequate to provide assurance that the public health and the environment will be protected, particularly over the long term. EPA has emphasized only ground water monitoring, a critical environmental and health threat, but not the only pathway for release of hazardous constituents. Monitoring of all environmental media is necessary including soil, water, air, and biota. The requirements as promulgated in the regulations will not provide data with which adequate assessments of the extent of hazardous constituent accumulation in the environment can be made.

I will summarize some of the particular problem areas that are in the testimony. We note that the exemptions to monitoring requirements granted to facilities with double liners and leak detection systems will liquidly result in a situation in which essentially all new facilities and extensions of old facilities will not be required to implement detection monitoring programs, supposedly the early warning mechanism to detect hazardous constituent releases from sites.

Another area that we object to is the number and frequency of sampling. Large differences between background and new samples will be required before statistically significant contamination is detected. Also, that the location of the sampling wells is left to the discretion of facilities owners.

The Agency's lines, a maximum of three downgradient wells, will not provide adequate representation of quality of all aquifers because of the complex shapes and flows. EPA is relying heavily on other major environmental monitoring programs; for example, the Clean Air Act, the Clean Water Act, to serve as detectors for environmental releases of hazardous constituents.

However, these acts do not relate very well to the types of materials associated with hazardous management. I might also note that there is exempt hazardous waste going to sanitary landfills which are not covered under subtitle C, but under subtitle D. This is another class of landfills, and these are not being regulated in any particularly stringent way, and a considerable large amount of hazardous waste is going into facilities where there are no monitoring requirements essentially for subtitle D facilities.

EPA has chosen a mix of three approaches for determining the ground water protection standards, and in our detailed testimony we have looked at all three approaches and essentially find all three lacking, that is they would not lead to a high degree of confidence.

I would also emphasize that one sees in the regulations often, particularly in the case of monitoring requirements, a shifting of decisionmaking and judgments to permanent writers, and with regard to ground water monitoring, it is really, I think, a major issue to ask whether these people have the technical expertise necessary to deal with the complexity of the substitute and whether that expertise can be sort of balanced against the expertise from the owners of facilities.

So, in summary, we have some serious concerns about the adequacy of the monitoring requirements of the final land disposal regulations. These monitoring requirements also hold important implications for the use of land disposal methods. Improving the stringency and adequacy of the requirements for land disposal would raise the costs of this option. The current regulations, therefore, will contribute to making land disposal attractive compared to technically feasible alternatives, such as chemical treatment, that more assuredly and permanently remove threats from hazardous waste.

I would like to comment about EPA's risks to policy model. EPA has recognized the need to implement the degree of hazard concept—the fact that wastes post difficult levels of hazards. They have correctly recognized the need to take into account the nature of the specific technology used and the location of the management facility. Considerable attention is being given at EPA to development of a tool called the risk/cost policy model, sometimes referred to as the W-E-T matrix. This is a complex model. I won't try to describe it in any detail. It is rather complex. It requires considerable use of large amounts of data. I would note that at the present time the model does not include any consideration of environmental damage. That should be of concern to people. Our primary concern with regard to this model, and I might note that the use of the model is indicated in the preamble to the land disposal regulations under the label of tailoring the regulations, and OTA's concern is that it will be some time before the model offers results of sufficient certainty to offer confidence in its use for regulatory policy development or regulatory form. There are a number of ways in which this model could be used.

For example, it might be used to discover what wastes should be prohibited from land disposal or it might be used to vary the stringency of the regulations, depending on location. We have a number of problems with the model and I will not go into all of these in detail, but I would say for example, that the data base, one of the data bases for the model concerning the waste generated, the amount of hazardous waste considered by the model, is just about over 50 percent of EPA's estimate of the natural waste stream, and that that does not include a large amount of wastes which are regulated by the States that have broader definitions of hazardous waste than EPA.

Another problem is that the model uses indicators of risk for various environmental conditions that are so simplistic as to yield inaccurate measures of the assimilative capacity of surface waters, contamination potential of ground waters, and populations at risk.

The model does not begin to accurately represent the potential enviromental fate of waste constituents in any component of the environment. I note that the model makes use of population density in a way which is perhaps rather perverse. That is, if the population density is low, then the model seems to be saying that one can accept higher levels of risk, and there are some substantial implications of using population density in this way for rural areas of the country.

While EPA's goals of recognizing the various hazard levels of waste and the needs to take into account locations of management facilities are appropriate, their risk/cost policy model is in too preliminary a stage of development for immediate policy use.

Correcting the model's limited data bases, faulty assumptions, and incorrect methodologies will take considerable time, but are necessary before the model can serve as a tool for evaluating management and regulatory options.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Hirschhorn follows:]

STATEMENT OF JOEL S. HIRSCHHORN
PROJECT DIRECTOR, OFFICE OF TECHNOLOGY ASSESSMENT
BEFORE THE
SUBCOMMITEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH
AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
UNITED STATES HOUSE OF REPRESENTATIVES

November 30, 1982

Mr. Chairman and members of the Subcommittee, my statement responds to your request to summarize our preliminary findings on EPA's regulations for land disposal of hazardous wastes. These findings are part of our on-going assessment on nonnuclear industrial hazardous waste. I am accompanied by Dr. Suellen Pirages, senior analyst on this project. Specifically, I will address two areas which OTA believes to be of critical concern from the perspective of protecting human health and the environment in the long term; these two areas are (1) the monitoring requirements of the current land disposal regulations, and (2) the premature use of EPA's Risk/Cost Policy Model to evaluate levels of actual risks for specific wastes, technologies, and sites as a tool for "tailoring" the waste management regulations. Our comments today are meant to be summaries of more detailed analyses contained in our final report to Congress, TECHNOLOGIES AND MANAGEMENT STRATEGIES FOR HAZARDOUS WASTE CONTROL, which we expect to issue early next year.

MONITORING REQUIREMENTS IN THE LAND DISPOSAL REGULATIONS

Current regulations for monitoring RCRA facilities are inadequate to provide assurance that the public health and the environment will be protected, particularly over the long term. EPA has emphasized only groundwater monitoring, a critical environmental and health threat, but not the only pathway for releases of hazardous waste constituents. Monitoring of all environmental media is necessary, including soil, water, air, and biota. The requirements as promulgated in the regulations will not provide data with which adequate assessments of the extent of hazardous constituent accumulation in the environment can be made.

Specific problems include the following:

1. The exemptions to monitoring requirements granted to facilities with double-liners and leak detection systems will likely result in a situation in which essentially all new facilities and extensions of old facilities will not be required to implement detection monitoring programs, an early warning mechanism to detect accumulation of hazardous constituents in groundwater
2. The number and frequency of sampling, as proposed in the regulations, are such that large differences between background and new samples will be required before statistically significant contamination is detected
3. Location of sampling wells is left to the discretion of facility owners. The Agency's guidelines, a maximum of three down-gradient wells, will not provide adequate representation of the quality of an aquifer in all cases because of the possibility of complex aquifer shapes and flows
4. Proposed test measurements for the monitoring programs suggest that inappropriate data may be collected,
5. Due to limitations in the state-of-the-art for analytical methodology, data requirements for compliance monitoring will be difficult to meet

There are serious problems concerning the present scope and detailed standards of the monitoring requirements. EPA relies heavily on other major environmental monitoring programs (for example, the Clean Air and Water Acts) to serve as detectors for environmental releases of hazardous constituents. However, constituents of concern for other environmental legislation do not include the diverse range considered important in hazardous waste management. Of particular concern is the lack of RCRA monitoring requirements for Subtitle D facilities, such as sanitary landfills, that can now receive hazardous wastes from small generators exempted under Subtitle C.

EPA has chosen a mix of three approaches, for determining a groundwater protection standard for land disposal monitoring programs; each has serious limitations. The first approach uses health-based contamination limits where such limits exist, based on the maximum contaminant limits established in the National Interim Primary Drinking Water Regulations under the Safe Drinking Water Act. These limits, however, were developed in early 1970 and were never intended for this type of use. Consequently, some limits are disputed and many components of hazardous wastes are not included.

EPA's second approach uses narrative criteria as determined on a site-specific basis in a permit by the Regional Administrator or State permit writer. Here the main concern is that important health policies, such as concentration limits on constituents capable of causing adverse effects on human health, are being left to the discretion of individual permit writers, rather than being formulated nationwide at the policymaking level. The potential variation in availability of highly technical information and in levels of sophisticated technical skills, could lead to both wide national variations in protection of public health which in turn could possibly cause the formation of so-called pollution havens.

EPA's third approach for the groundwater protection standard relies on restriction to the background concentration for hazardous constituents. Three areas of uncertainty exist: (1) the effectiveness of the current methodology to detect all hazardous constituents in environmental samples; (2) adequacy of sampling methods proposed in the regulations, including sample size, and the frequency and location of sampling; and (3) the statistical methods suggested by EPA to compute background sample means and sample variance. If permits do not specify stringent requirements for each of these three areas, the third approach will be substantially compromised.

In summary, there are several serious concerns about the adequacy of the monitoring requirements of the final land disposal regulations. These monitoring requirements also hold important implications for the use of land disposal methods. Improving the stringency and adequacy of the monitoring requirements for land disposal would raise the costs of this option. The current regulations, therefore, will contribute to making land disposal attractive economically, compared to technically feasible alternatives that more assuredly and permanently remove threats from hazardous wastes.

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EPA'S RISK/COST POLICY MODEL

EPA has now recognized the need to implement the degree-of-hazard concept - the fact that wastes pose different levels of hazard. They also have correctly recognized the need to take into account the nature of the specific technology used and the location of the management facility. However, considerable attention is being given to development of a tool called the Risk/Cost Policy Model, sometimes referred to as the "W-E-T matrix." Before summarizing the problems we have found with the model, I will first briefly describe our understanding of the model and how EPA may use it.

This model consists of a multi-dimensional framework that organizes and combines various characteristics of wastes (W), environmental settings (E), and management technologies (T). Scores for cost and risk are assigned to each W-E-T combination. The costs are defined as representing real resource costs such as capital and operating expenditures. Other significant management and compliance costs that vary according to management approach are not included. Risks are narrowly defined as risk to human health only and are based on toxicity and exposure measures. There is now no consideration of environmental damage. OTA and other groups, including EPA's Science Advisory

Board, who have attempted to analyze this model have had difficulties because of its extreme complexity and the importance to the outcome of the model of a number of data sets, not all of which are accessible to reviewers.

In the land disposal regulations and in several statements presented to Congressional hearings during the past year by senior EPA officials, EPA has indicated that it will use degree-of-hazard. The EPA staff working on the development of the model appear to understand the very early stage of the model's development, the current considerable uncertainties of results obtaining by exercising the model, and the need to spend substantially more time in developing and validating the model. OTA believes that it will be some time before the model offers results of sufficient certainty to offer confidence in its use for regulatory policy development or regulatory reform. At some time in the future, after some model results are verified, it would be appropriate to use it as a "screening" tool, to determine Agency priorities and areas for regulatory reform, and to "tailor" or "fine tune" RCRA regulations. For example, in conjunction with other work, the model might be used to determine what wastes might be prohibited from landfills, what wastes would qualify for exemption from small quantity generators, and what facilities might qualify for regulatory execptions and variances, or for class permits.

Another concern is that the model incorporates costs (although we believe incompletely), and is playing some role in EPA's regulatory impact analyses performed under Executive Order 12291. The balancing of risks and costs is not called for in RCRA, but the use of the model for regulatory tailoring may constitute a form of cost-benefit analysis for decision-making.

OTA has examined the model in detail and considers the following problems to be serious enough to question its premature use - even as a screening tool. Many of OTA's concerns are of a highly technical nature; the following are only brief summaries of the most serious:

1. The model's data base represents just over 50 percent of the EPA estimate of the national annual waste generation. For some applications this data base may be reasonable, especially for some prelimary screening functions. But for other applications this limited data base may be inappropriate. The current data base also ignores large amounts of Federally unregulated wastes which some States define as hazardous, and this could lead to Federal policies that do not adequately take into account actual management choices and the commercial availability of methods to deal with these wastes.

2. The technologies considered as major single treatments, in conjunction with land disposal, are incineration and chemical fixation/stabilization. Neither of these methods have widespread application in current waste management. Considering only these two treatment options in this way, and not others, would likely lead to an improper evaluation of management alternatives to land disposal.

3. The assumptions used in the model for defining indicators of risk for various environmental conditions are so simplistic as to yield inaccurate measures of the assimilative capacity of surface waters, the contamination potential of groundwater sources, and of populations at risk. The model does not begin to accurately represent - for even first order approximations of risk - the potential environmental fate of waste constituents in any component of the environment.

4. Modifications made to risk scores by the model give disproportionate weight to dilution capability of the environment and to the size of the nearby population, without considering the actual environmental fate of constituents. Regardless of which waste or technology is incorporated into a W-E-T combination, the risk scores will decrease with decreasing population density close to the waste site. This procedure raises concerns over public health protection for currently rural areas.

Finally, it is important to note that at this stage of development, the model's cost scores are biased in favor of land disposal. The model will indicate, for example, that land disposal facilities without pre-treatment, and located in areas of low population density will have more favorable costs and lower risks when compared with other management alternatives and population densities.

In summary, while EPA's goals of recognizing the varying hazard levels of wastes and the need to take into account the technologies and locations of management facilities are appropriate, their Risk/Cost Policy Model is in too preliminary a stage of development for immediate policy use. Correcting the model's limited data bases, faulty assumptions, and incorrect methodologies will take considerable time, but are necessary before the model can serve as a tool for evaluating management and regulatory options.

Mr. SCHEUER. Thank you very much.

Congressman Carney, any questions for this panel?

Mr. CARNEY. I would like to ask a question of all four members of the panel that would not require a long answer.

Do you believe that there is any type of landfill application that you could use for the disposal of hazardous waste?

Mr. Sanjour?

Mr. SANJOUR. In theory there is. In theory there are a lot of things you could do if you had a government which was composed of high-class scientists and highly-motivated technicians. But, in fact, in order to do it right depends on the Government doing it right. And I don't think we can depend on the Government doing right because they never have before and I see no reason why they would in the future.

And there are alternatives that do not depend on a Government bureaucracy for doing it.

Mr. CARNEY. Dr. Brown.

Dr. BROWN. I believe there are ways. Certainly there are geology settings where a landfill could be used or the flow of water is going to be to ground water tables 3,000 feet and it is so salty you wouldn't use it anyway.

There are areas where you could install such a facility, but as I alluded to, I believe that if we began putting these things above ground, we would be much better off.

Certainly there will always be solid wastes we have to get rid of and if we put them above ground out of contact with ground water, I think we could design facilities. There is a lot of technology available. We are not using as much fixation chemical layers absorb things. If we put that together, I think we could design facilities that would protect our ground water. They would put perhaps a little more burden on surface water in the future, but surface is more easily identified and cleaned up and could be handled.

Mr. MILLER. Industry has to have a place to put wastes and we are not going to end landfilling for quite some period of time.

There are geologic environments where you can put wastes and as long as you understand what the consequences are, that you may end up writing off certain aquifer areas. Certain areas are already written off because of poor quality of water. So that if it was gone about in a scientifc manner, and I agree that there isn't enough science around, but there has to be landfilling and we can do some of it at least correctly.

Mr. CARNEY. Do you believe that the Government is not capable of doing it, that they don't have the willingness to do it?

Mr. MILLER. Depends on what you mean by capable. Willingness I have no competence to comment, because I am not a Government employee.

Mr. CARNEY. That doesn't matter.

Mr. MILLER. If you mean do we have enough properly trained people to carry out the assignment indicated in the regulations, I would say, no, you don't have enough properly trained people to carry out those assignments.

Dr. HIRSCHHORN. In terms of appropriateness of land disposal, there are several types of wastes that we will need land disposal for, toxic heavy metals and residuals, and biodegradable types of hazardous wastes that might be appropriate. I would note that using pretreatment, encapsulation, and fixation probably could be emphasized a great deal more, putting the barrier around the wastes.

Another point that we are not mentioning is that there are tremendous opportunities for waste reduction in the first place, that is, stop producing hazardous waste at the source. Right now, there are not a lot of incentives for doing that.

Mr. CARNEY. In your testimony, Dr. Hirschhorn, you are saying that certain municipalities are exempt from monitoring requirements, particularly if they use a double liner technique. Is that everyone or just municipalities?

Dr. HIRSCHHORN. That would be for everyone. There is an aspect to the regulations which would allow operators under certain conditions to get out of the detection monitoring requirements, and that would be for private operators also.

Mr. CARNEY. I would like to ask a question of Mr. Miller. This is kind of a parochial question because Mr. Miller comes from Long Island and might be familiar with the particular problem that we have with the Babylon landfill there. Then again, you might not be familiar with it, so if you aren't, I can understand that. Babylon feels like they can't meet the liner requirements because of the cost and they feel that the area is already contaminated. Would you like to give me your opinion on that?

Mr. MILLER. I really don't know their capability of whether they can pay or not. Insofar as the situation there is concerned, that is a plume of contamination that has stabilized. It is not going anywhere. It is a place where you could put waste with a very minimum of additional impact. In fact, there won't be any additional impact, because it is one of the areas where the contamination and the flow system is such that by the time you get to the end, which is several miles, you have a lot of area contaminated, but you are not going to contaminate anymore because the thing is old enough and the flow system is stabilized. So, it has been written off, but you can continue to add waste without any adverse effect to the environment.

Mr. **Carney**. I guess that comes back to what you said before, that there are areas that we must realize it is senseless to try to take remedial steps to try to clean up.

Mr. **Miller**. This would probably take the entire budget of Nassau and Suffolk County for 10 years to clean up. We control ground water pumpage on Long Island. You can't have a ground water protection program without controlling pumpage and water quality problems. It is really called plume management and that is one of the ways that you can live with these things.

Mr. **Carney**. Mr. Chairman, I would like to, if possible, go another round?

Mr. **Scheuer**. We have another panel. We will have a chance to submit questions in writing.

Mr. **Carney**. I apologize to the witness for asking a question so parochial that you probably don't have an understanding of.

Mr. **Scheuer**. Congressman Brown.

Mr. **Brown**. I have no questions.

Mr. **Scheuer**. Congresswoman Schneider.

Mrs. **Schneider**. I would like to ask the panelists to elaborate on the retrofitting of the existing facilities and their general attitude as to whether it is dangerous or financially impractical.

Mr. **Sanjour**. As I said in my written testimony, the technology of liners doesn't work. Liners really don't prevent leakage. They slow it down. When you slow it down, you are not really doing the community that lives there any great favor, because if it is going to leak eventually, it is better for them that it leaks sooner than later, because then there will be responsible parties that they can get to clean it up and they will be waiting for it. The longer it takes the pollution, the more dangerous it is. The community has forgotten with the problem, they have not tended to do the kind of monitoring—a land disposal site has to be maintained in perpetuity. A road or a highway or bridge is like that—it has to be continually maintained. The longer the problem is put off, the less likely that that maintenance will take place. In addition, the community will pooh-pooh the problem as they did in Love Canal and start to build houses closer to the facility and put schools and golf courses on top, and then when the pollution hits, it is far more dangerous.

So, liners don't protect the community. They protect the people who put the waste there and the politicians who let them put the waste there, because they are long since done when the problem comes up.

Mrs. **Schneider**. You said you felt it would be a good idea if we had a law that would ban the practice, leaving the bureaucracy out. Isn't part of the reason that the EPA and the Government, in general, is involved in the hazardous waste disposal process is because there was no attention to the public health and public well-being, and that there were so many violations because it was left to the free market?

Mr. **Sanjour**. Yes.

Mrs. **Schneider**. But then aren't you then suggesting that we continue to have these types of abuses continue if we get the Government out?

Mr. **Sanjour**. No.

Mrs. **Schneider**. Who else will be the monitor of the public welfare?

Mr. **Sanjour**. The law which you passed, RCRA, required of EPA not that they manage landfills, but that they write standards, standards adequate to protect human health in the environment, standards for how hazardous wastes should be handled.

Mrs. **Schneider**. Those standards are to be enforced by the EPA.

Mr. **Sanjour**. Yes; but the standards depend on some Government agency perpetually maintaining a site, perpetually monitoring and upkeeping it. They are unworkable and EPA knows that. I propose that the standards that EPA write are standards which destroy waste, since they can be destroyed, that is what we should be doing, not burying them in the ground and leaving them to the future detriment of the community. Let's destroy them and get rid of them and once they are gone, you don't have to worry about them.

Mrs. **Schneider**. Dr. Hirschhorn, I would like your feedback on the idea of whether it is dangerous and impractical for the retrofitting of existing facilities. Maybe you can elaborate a bit more on your population criteria.

Dr. **Hirschhorn**. In a sense it is technically feasible to retrofit, but you are talking about doing something that is very difficult, very complex and very expensive, that even might increase some risks because of doing the retrofitting. Again, I would echo what you already heard, that even if you retrofit, you are still utilizing technology which does not provide a great deal of certainty that waste releases will be prevented.

Another view on retrofitting that you might consider is that a softer way of approaching it is trying to adjust the use of existing landfills with regard to the types of hazardous waste, that is the levels of hazard that they pose, and trying to perhaps make more appropriate use of landfills and going in and looking at the particular landfill, seeing how good it is, what the location is and perhaps limiting its use to certain types of hazardous waste.

Insofar as pollution density is concerned, in a number of instances, EPA has been using population density as a critical factor in its risk models. This was done in the case, for example, under Superfund, the model makes use of population density, the risk/cost policy model makes use of it and other work at EPA makes use of it in a way that leads to the conclusion that their evaluation of risk essentially says that the lower the population density, the lower the risk. That is it ignores the risk to individuals, that is a relatively small number of people may be exposed, for example, in the case of a landfill to a release. They may have a contaminated well for example, but in the EPA methodology, small numbers of people exposed to perhaps high risk will always come out second best to larger numbers of people in high density regions which may be exposed to lower risks.

Mrs. **Schneider**. Just one final question that I would like to ask of each of you.

Each of you has essentially answered this already in your testimony at great length, but I would like a one-word answer, yes or no. That is that the intent of the act was to provide for the greatest possible protection to the public health from hazardous waste dumping based on the best possible scientific data obtainable. Do you think that the EPA regulations meet that goal?

Dr. **Hirschhorn**. I would say no.

Mr. **Sanjour**. No.

Dr. **Kirk Brown**. No.

Mr. **Miller**. I have to say no.

Mrs. **Schneider**. All right, we have unanimous consent. It looks like we need to do something here panel. Thank you very much, gentlemen.

Mr. **Scheuer**. Dr. Miller, your statement discussing the high costs associated with the cleanup of ground water. What is your estimate of the average cost, the range of the cost for cleanup of severely contaminated ground water, and do you think complete restoration is feasible within that range of cost?

Mr. **Miller**. Based on experience in cleanup projects, I would say the cost ranges from anywhere from $5 million to hundreds of millions of dollars.

Mr. **Scheuer**. For each site?

Mr. **Miller**. Yes; that is the ground water component. That doesn't include a lot of the cleanup of the surface, either.

Mr. **Scheuer**. Could you give us an off-the-cuff estimate for cleanup for the more than perhaps 50,000 contaminated sites in the country?

Mr. **Miller**. I would have to multiply it with an average number.

Mr. **Scheuer**. You are talking about billions?

Mr. **Miller**. A lot of money to clean up most sites, not only does it cost a lot of money, but it takes decades. One of the things that has protected us is one of the factors that makes it very difficult to get out. There are small bodies of ground water such as spills that have been cleaned up. There are some cleanup operations going on around the country where they are pumping the water out of the ground, treating and recharging it which contain the contaminant from moving. So, there are situations where it is being attempted and where you should, but they should be chosen very carefully.

Mr. **Scheuer**. Is complete restoration feasible, in your opinion, for the majority of these sites?

Mr. **Miller**. You can't go back to where you started. That is impossible.

Mr. **Scheuer**. We are way behind on this panel and it is evident that you have challenged and stimulated us and we have found this a provocative and useful session.

Thank you all very much for your testimony. Please expect to get additional questions in writing, for which we would be grateful for your very expeditious attention.

We will now hear from the industry panel, panel No. 2, Philip Palmer, Chemical Manufacturers Association, Richard Hall, Hazardous Waste Treatment Council, and Dr. Charles Johnson, technical director of the National Waste Management Association. I understand that the Hazardous Waste Treatment Council has delegated their testimony to Mr. Clay Robinson.

Will you all take your seats? We are running very late, so we are going to ask all of you to stick closely to the 5-minute rule, which we will be calling a tight 5 minutes from here on in so we have time to ask you all some questions.

I think this time we will go right through the panel before we ask any questions at all.

Mr. **Scheuer**. Mr. Philip Palmer of Chemical Manufacturers Association.

STATEMENTS OF PHILIP PALMER, CHEMICAL MANUFACTURERS ASSOCIATION; CLAY ROBINSON, HAZARDOUS WASTE TREATMENT COUNCIL, ACCOMPANIED BY NELSON V. MOSSHOLDER, TECHNICAL DIRECTOR; AND DR. CHARLES JOHNSON, TECHNICAL DIRECTOR, NATIONAL SOLID WASTE MANAGEMENT ASSOCIATION

Mr. **Palmer**. I would like to state from the beginning that CMA is cognizant of the inadequacies of many of the past land disposal practices and of the potential environmental and human health consequences resulting from these practices. Even though we are convinced that landfilling of most hazardous wastes can be done in an environmentally sound manner, we acknowledge the need to reduce dependency on landfills. To this end, the chemical industry's priorities are to reduce waste generation and to reuse or recycle byproducts. Such recycle and reuse practices represent, from CMA's perspective, one of the most important ways to reduce the potential for hazardous waste problems. CMA members have traditionally used advanced treatement technologies where practicable. For example, in excess of one half of the hazardous waste incinerators in the country are within the chemical industry. Most of these were installed prior to RCRA and were a considerable voluntary investment in capital and operating cost when less expensive disposal methods could have been used. Despite emphasis by responsible waste generators on finding alternatives to landfilling, some wastes must be landfilled. Even as advanced methods of waste treatment become widely available, these facilities will inevitably create residues that will have to be disposed of in the land. Consequently, landfilling of some wastes will continue to be necessary.

Turning to EPA regulations, the standards allow construction of facilities throughout the country which will tend to minimize long distance shipment and allow generators the option of maintaining responsiblity for their waste through onsite disposal. We believe EPA has developed a coherent systems approach which, if considered in its entirety, will fully protect the environment. EPA's regulations are based on liquid management that minimizes the introduction of liquids into the landfill and maximizes leachate collection during operation. The standards are also designed to eliminate rainwater percolation as a source of new leachate generation after closure. Ample time is provided for drying up the landfill through leachate collection after closure. The regulations also provide for the rapid detection and cleanup of contaminated ground water which may result from unexpected leakage from new or existing facilities which accept waste after the effective date of the regulation.

Waste deprived leachate will be minimized by EPA's policy of prohibiting the landfilling of containers with freestanding liquids. We believe that the concept of using a bottom liner that prevents migration of contaminants is appropriate. EPA's leachate collection system can provide a highly efficient mechanism for collecting and removing leachate during the operating life of the facility and the postclosure period as leachate generation diminishes. In addition, EPA has specified a sophisticated multilayer facility cover designed to keep rainwater from percolating into the facility after closure, thereby preventing leachate formation.

One advantage of a landfill cover-based leachate control system is that the system is readily repairable from the surface without disturbing the disposed waste.

An institutional problem that we are concerned about is that the regulations issued thus far lack financial responsibility provisions for ground water cleanup, although EPA has made clear their intent to draft such requirements. CMA believes as does EPA that ground water cleanup measures are the key means of protecting human health and the environment if all other ground water protection measures have failed. To insure that these measures will be undertaken, CMA supports the institution of appropriate financial responsible requirements as a necessary component of the hazardous waste disposal regulation. We believe that financial assurance mechanisms like those adopted for closure and postclosure regulations can be modified for assuring corrective action. We continue to support strongly the financial test and corporate guarantees as appropriate financial assurance mechanisms for corrective action as well as for closure, postclosure, and liability.

CMA believes that the current design and operating standards constitute state-of-the-art technology and will be effective in curtailing those land disposal practices which create unacceptabe risks.

Turning to another substitute, which is land disposals and bans, CMA believes the implications of landfill bans must be given serious consideration. Many hazardous wastes are already receiving considerable treatment and, treatment will become more economically competitive as the new EPA regulations are implemented. We believe the Nation is headed toward a condition where landfills will be used as a last resort rather than a convenient method of disposal.

In addition, many of the processes are not as universally applicable as one might think. For example, we have found that a high technology, highly efficient solvent recovery process which works well in one plant's waste will not work on wastes from another nearly identical plant. Wastes by their nature are nonuniform, variable, and unpredictable in properties and not always good feedstocks for sophisticated processing devices. This problem, as it relates to regulatory programs, is of considerable concern to CMA. Regulations could take the form of bans or required treatments for broad generic classes of wastes. We believe no matter how carefully such regulations are drafted, there will probably always be wastes which cannot or should not be handled as the regulations might specify.

Even if we determine that certain wastes warrant the application of certain treatment techniques, we must allow time for an orderly transition to their use.

In closing, CMA wishes to reiterate our support for the general direction of the EPA land disposal regulations and restate our firm convictions that hazardous wastes can be landfilled in an environmentally acceptable manner. Nevertheless, we should endeavor to decrease our dependence on landfills where it makes sense

Thank you.

[The prepared statement of Mr. Palmer follows:]

CMA
CHEMICAL MANUFACTURERS ASSOCIATION

STATEMENT OF

PHILIP A. PALMER

OF THE DU PONT COMPANY

ON BEHALF OF THE

CHEMICAL MANUFACTURERS ASSOCIATION

BEFORE THE

SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT

COMMITTEE ON SCIENCE AND TECHNOLOGY

UNITED STATES HOUSE OF REPRESENTATIVES

ON

LAND DISPOSAL OF HAZARDOUS WASTES

November 30, 1982

2501 M Street, NW • Washington, DC 20037 • Telephone 202/887-1100 • Telex 89617 (CMA WSH)

My name is Philip A. Palmer. I am an employee of the Du Pont Company and a member of the Resource Conservation and Recovery Act (RCRA) Regulations Task Group of the Chemical Manufacturers Association (CMA). Today I am speaking for CMA, a nonprofit trade association whose company members represent more than 90% of the productive capacity of basic industrial chemicals within this country.

CMA welcomes this opportunity to address issues associated with land disposal and EPA's regulations for land disposal of hazardous waste. The chemical industry is one of many industries that generate hazardous waste. CMA's members have a strong interest in assuring that treatment and disposal regulations are cost-effective and protect human health and the environment.

We wish to emphasize the following points:

o Our industry is a leader in recycle and reuse of waste and in the use of advanced waste treatment technologies. CMA does, however, acknowledge the need to further reduce dependency on landfills.

o EPA has developed a coherent regulatory program for landfills which will minimize the probability for environmental release and through site monitoring will assure that human health and the environment will be protected. CMA has some concerns, however, about EPA's groundwater compliance standards and present lack of regulations assuring financial responsibility for remedial actions.

- Landfill costs have increased significantly and will increase even more, thereby making alternate treatment technologies and recycle and reuse more economically competitive. Imposition of landfill bans or pretreatment requirements must be approached with caution and restraint.

Waste Generation, Treatment and Land Disposal

I wish to state from the beginning that CMA is cognizant of the inadequacies of many past land disposal practices and of the potential environmental and human health consequences resulting from these practices. Even though we are convinced that landfilling of most hazardous wastes can be done in an environmentally sound manner, we acknowledge the need to reduce dependency on landfills. To this end, the chemical industry's priorities are to reduce waste generation and to reuse or recycle by-products. Many of these by-products have considerable fuel value and, in an era of rapidly rising energy prices, they have been substituted or supplemented for conventional fuels. We firmly believe, based upon early results from EPA tests on burning practices in industrial boilers, that these practices will be shown fully protective of human health and the environment. For many by-products such as spent methanol from the manufacturing of fibers, we have recycled from the start. Similarly, techniques have been pursued to recover other valuable organic and inorganic materials as raw material costs have risen. Such recycle and reuse practices represent, from CMA's perspective, one of the most important ways to reduce the potential for hazardous waste problems. CMA members have traditionally used advanced treatment technologies where practicable. For example, in excess of one half of the hazardous waste incinerators in the country are within the chemical industry. Most of these were installed prior to RCRA and were a considerable voluntary investment in capital and operating cost when less expensive disposal methods could have been used.

Despite emphasis by responsible waste generators on finding alternatives to landfilling, some wastes must be landfilled. Even as advanced methods of waste treatment become widely available, these facilities will inevitably create residues that will have to be disposed of in the land (inorganic sludges fall in this category). Moreover, it is not practicable to incinerate certain primarily inorganic wastes that won't burn. Some such wastes are very high in volume. Intrinsic characteristics of others make landfilling the most appropriate method for safe management. Many such wastes are sludges created by air and water pollution control systems.

Consequently, landfilling of some wastes will continue to be necessary.

Our industry has traditionally chosen to assume the responsibility for waste disposal by keeping most wastes on our plant sites. On-site disposal allows control of disposal techniques, minimizes risks from transportation, and is more cost-effective for large volumes of waste. The industry's preference for disposal at the site is illustrated by the 1979 survey conducted by the Subcommittee on Oversight and Investigation of the House Committee on Interstate and Foreign Commerce. This report revealed that between 1950 and 1979, 54 chemical companies treated or disposed of 93% of their process wastes on-site and 7% off-site. During the same period, 99% of such chemical industry waste was treated or disposed of in the same state in which it was generated.[1]

EPA Landfill Regulations

CMA is pleased that EPA has, after years of hard work, issued its regulations for permitting hazardous waste land disposal facilities.

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[1] A recent EPA compilation showed that at least 73% of all hazardous wastes are disposed on-site. (Solid Waste Data, A Compilation of Statistics on Solid Waste Measurement within the U.S., Aug. 1981, JRB Assoc.)

Based upon our in-depth review of the document, CMA believes that the regulations are tough but generally workable and will protect the environment. Compared to earlier EPA proposals these regulations provide much more specific guidance on acceptable design for new facilities and operating procedures and environmental protection standards for new and existing facilities. The standards allow construction of facilities throughout the country which will tend to minimize long-distance shipment and allow generators the option of maintaining responsibility for their wastes through on-site disposal.

We believe EPA has developed a coherent systems approach which, if considered in its entirety, will fully protect the environment. EPA's regulations are based on liquid management that minimizes the introduction of liquids into the landfill and maximizes leachate collection during operation. The standards are also designed to eliminate rainwater percolation as a source of new leachate generation after closure. Ample time is provided for drying up the landfill through leachate collection after closure. The regulations also provide for the rapid detection and cleanup of contaminated groundwater which may result from unexpected leakage from new or existing facilities which accept waste after the effective date of the regulation.

Waste derived leachate will be minimized by EPA's policy of prohibiting the landfilling of containers with freestanding liquids. We believe that the concept of using a bottom liner that prevents migration of contaminants is appropriate. EPA's leachate collection system can provide a highly efficient mechanism for collecting and removing leachate during the operating life of the facility and the post-closure period as leachate generation diminishes. In addition, EPA has specified a sophisticated multilayer facility cover designed to keep rainwater from percolating into the facility after closure. This, combined with the leachate collection system, will eliminate the so-called "bathtub effect". (The "bathtub effect" occurs when a landfill has a more permeable cap than liner and water eventually accumulates in the landfill and leachate begins to exit the landfill laterally.)

One advantage of a landfill cover-based leachate control system is that the system is readily repairable from the surface without disturbing the disposed waste. If we have one criticism of EPA's cover design, it is that the cover is unnecessarily complex and that simpler designs will provide the same protection, particularly in drier climates. Unfortunately, there have been no studies to date which quantify the amount of leachate produced after closure of a secure landfill of roughly comparable design to that required by EPA. We believe, however, that closure with simpler designs will virtually eliminate continued leachate generation.

We believe that the requirement that groundwater cleanup measures be taken upon detection of actual contamination is an important safeguard. It will ensure adequate protection to human health and the environment. Clear definition of the disposer's considerable responsibility for remediation will also encourage the use of redundant designs and spur innovation of new disposal systems.

As part of its groundwater protection plan, EPA developed the concept of the alternate concentration limit (ACL) for defining those cases where some leakage to the environment will be allowed. CMA endorses this concept because some situations pose no threat to public health or the environment. We believe the showing the owner must make with the ACL will be extremely difficult, but will be important in those situations where there is clearly no harm.

CMA has two major concerns about EPA's regulations: one is technical, the other institutional. We believe a sound groundwater monitoring program is essential to maintain public confidence in the integrity of the landfill and to rapidly detect problems if they occur. Unfortunately, we find that EPA's statistical procedure for evaluation of groundwater monitoring data has a very high probability of indicating leakage when, in fact, there is none. In other words, even virgin groundwater will almost certainly fail the statistical test in the first or second year of sampling. This is because the statistics do not take into account normally expected sampling variability. Obviously, this problem must be corrected rapidly so that EPA and the owners of the land disposal facilities are not overwhelmed with false indications of noncompliance and the public's confidence in land disposal systems is not further eroded.

In addition to these statistica problems, the regulations as now promulgated require complete analysis of all wells for all 387 Appendix VIII substances, when indicator parameter analysis shows possible groundwater contamination. Because of the high probability of false positives, the current lack of laboratory capability to perform such an analysis, and the projected very high cost per sample, this requirement appears impractical and unduly burdensome. The universe of analytical requirements must be reduced to those compounds or surrogates reasonably expected to be present.

The second, institutional problem is that the regulations issued, thus far, lack financial responsibility provisions, although EPA has made clear their intent to draft such requirements. CMA believes, as does EPA, that groundwater cleanup measures are the key means of protecting human health and the environment if all other groundwater protection measures have failed. To ensure that these groundwater cleanup measures will be undertaken, CMA supports the institution of appropriate financial responsibility requirements as a necessary component of the hazardous waste land disposal regulations. We believe that financial assurance mechanisms like those adopted for the closure and postclosure regulations can be modified for assuring corrective action. We continue to support strongly the financial test and corporate guarantees as appropriate financial assurance mechanisms for corrective action as well as for closure, postclosure, and liability.

It should be noted that financial responsibility for corrective action can be eliminated for facilities where the Postclosure Liability Trust Fund, established under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) has assumed liability. This fund is supported by a special tax on hazardous waste disposal. Under Section 107(k) of CERCLA, the liabilities of a hazardous waste disposal facility permitted under RCRA are transferred to the Fund if the facility has been closed in accordance with the permit and has been monitored for up to five years after closure to demonstrate that there is no substantial likelihood of any off-site migration, release from confinement, or other health threat posed by the hazardous substances disposed of at the site. We believe that a facility closed in accordance with the EPA regulations would have fulfilled this financial responsibility requirement and urge a sensible interpretation of Section 107(k) that focuses on the potential threat posed to health and the environment from off-site migration during the five-year monitoring period.

CMA believes that the current design and operating standards constitute state-of-the-art technology and will be effective in curtailing those land disposal practices which create unacceptable risks. Institution of appropriate financial responsibility measures for corrective action will supply complementary institutional safeguards to protect human health and the environment.

Alternatives to Landfilling

Increasing national attention is being paid to inadequacies of past land disposal practices and to the potential environmental and human health consequences resulting from these practices. These facts have led some to recommend a near-term prohibition on landfilling of certain supposedly high-risk materials and, in the longer term, a complete prohibition against landfilling of hazardous wastes. Landfill ban proponents expect that the institution of such bans will force the use of treatment technologies which would not otherwise be economically competitive with landfilling.

CMA believes the implications of such bans must be given serious consideration. Many hazardous wastes are already receiving considerable treatment and treatment will become more economically competitive as the new EPA regulations are implemented. We believe the nation is headed toward a condition where landfills will be used as a last resort rather than a convenient method of disposal. Other environmental regulations have required treatment or pollutant removal, or have restricted discharge to surface waters, air, or the oceans. These efforts have produced wastes such as sludges from industrial wastewater treatment for which there is often no other viable alternative but land disposal. Ill-considered bans could have far-reaching effects on the viability of industrial operations and on other environmental cleanup activities.

Some believe waste disposal bans will force the use of advanced technologies. Considerable note is often made of the many processing techniques which could be used on wastes and the question asked, why not? The chemical industry certainly uses most of them in producing a product and is well aware of their advantages and shortcomings. The fact is that many of these techniques are used to recover chemicals, solvents, or metals, but the remaining residues defy further processing.

In addition, many of the processes are not as universally applicable as one might think. For example, we have found that a high technology, highly efficient solvent recovery process which works well in one plant's waste will not work on wastes from another nearly indentical plant. Wastes by their nature are nonuniform, variable, and unpredictable in properties and not always good feedstocks for sophisticated processing devices. This problem, as it relates to regulatory programs, is of considerable concern to CMA. Regulations could take the form of bans or required treatments for broad generic classes of wastes. We believe no matter how carefully such regulations are drafted, there will probably always be wastes which cannot or should not be handled as the regulations might specify.

We believe that solutions to the problem of hazardous waste disposal must consider the environmental consequences of the alternatives to landfill as well as those of landfill without treatment. The large majority of treatment techniques will themselves produce waste. Legislators and regulators should focus their attention on the treatment-land disposal combination which will reduce risk to acceptable levels at acceptable cost. This requires consideration of the waste characteristics as those characteristics relate to treatment or disposal options; treating waste merely for treatment sake makes little sense in some situations. For example, consider a tar-like waste which contains metals or metal salts. The metals are persistent, but the tar greatly reduces their mobility. Instead of landfilling, should we incinerate the material and collect the metals from the flue gas as a sludge? This would probably result in scrubber water containing salt and some metals being discharged into surface water, and landfilling a sludge containing metals, perhaps in more mobile form than in the tar. The questions we must ask are what have we gained by using the technology and was it worth the cost?

Even if we determine that certain wastes warrant the applications of certain treatment techniques, we must allow time for an orderly transition to their use. Immediate disposal bans, as exemplified by the PCB bans, only lead to chaos for the generator and potential disposer. Storage backlogs of PCBs still exist today from the bans which occurred during the period landfills and incinerators were being developed and permitted for use. An entirely untenable situation would arise if the same approach were taken for more widely generated hazardous wastes.

In closing, CMA wishes to reiterate our support for the general direction of the EPA land disposal regulations and restate our firm convictions that hazardous wastes can be landfilled in an environmentally acceptable manner. Nevertheless, we should endeavor to decrease our dependence on landfills where it makes sense.

Mr. SCHEUER. Thank you very much.

Mr. C. Robinson of the Hazardous Waste Treatment Council.

Mr. ROBINSON. I am Clay Robinson, speaking for the Hazardous Water Treatment Council and I have sitting with me, Nelson Mossholder of Stablex Corp., also speaking for the council.

The scientific evidence is overwhelming that there is no such thing as a secure landfill. Inevitably, any material in a landfill cell which is subject to leaching or being washed out of the cell in due course will be. Nonetheless, more than 6 years after the adoption of the Resource Conservation and Recovery Act [RCRA], the EPA has still not published regulations to prohibit from landfilling toxic substances which will readily migrate from a landfill cell.

Not only has the failure of the EPA tc promulgate appropriate regulations unnecessarily endangered American citizens, but it has had a chilling effect upon the development of higher technology alternatives to landfilling.

One would have supposed that the adoption of RCRA, promising as it did significantly more stringent regulation of the disposal of toxic wastes, would have led to a boom in the development of alternative treatment facilities. Such has not been the case. I do not believe that there has been even one commercial toxic waste incinerator which has been initiated and placed in operation since 1976. I will attempt in these comments to express my opinion of why that is the case.

To begin with, the construction of a high technology facility requires a large amount of capital. Furthermore, a great deal of that capital must be invested with the prospect of years of waiting before it can begin to generate profit. Because of these two factors, disposal of toxic wastes by high technology means costs more than does unregulated landfilling. Therefore, there cannot be an economic return on the invested capital for such a facility so long as toxic waste which can be readily incinerated, treated or stabilized is nonetheless directed to landfills because they are cheaper. Apparently it has been the perception of those who might have invested the capital that the EPA is unwilling to adopt a set of regulations which will result in high technology disposal being an economically viable alternative.

Why is that the perception? One can start with the fact that after 6 years of RCRA we still do not have a complete set of regulations. Then one continues with the fact that those regulations as adopted after that 6-year hiatus do not prohibit the landfilling of bulk liquids, do not prohibit the landfilling of readily leachable toxic materials, and indeed exempt from any significant regulation for an unknown period of time a substantial portion of the existing landfill facilities. The exemption provides that the existing portion of an interim status landfill need not install liners or leachate collection systems until part B of its permit is, in the phasing of the EPA, called in. That doesn't sound like a serious exemption until one understands that by existing portion the EPA means all land that was described in the part A application. This means that there is a landfill, for example, in the State of Alabama where, I have heard it estimated, 50 percent of the commercial toxic waste disposal east of the Mississippi is now occurring, and has hundreds of acres included in its existing portion will not be meaningfully regulated for a period up to 5 years, that being the period of time which EPA estimates will be required for the calling in of all of the part B applications for landfills. I add that the EPA is probably correct in its position that it makes no sense to require the retrofitting of partially filled cells with a liner and leachate collection system, but there can be no justification for the EPA's refusal to require that unopened cells of existing portions be constructed to state-of-the-art standards.

There are other lacunae in the present status of the regulation of the disposal of toxic wastes. For example, appropximately one-half of all such wastes which are subject to incineration are totally exempt from regulation. Those wastes are being disposed of by the generator through a waste heat boiler or are being shipped to a blender, who, supposedly, mixes them with fuel oil which blend is then sold for use in heating units. This 50 percent of wastes subject to incineration is totally outside the system. It is not regulated in any fashion. This last point introduced what is probably the single most significant reason for the lack of investor enthusiasm for constructing high technology commercial facilities, and that is the disparity in the level of regulation to which such a facility is subjected as compared to that placed on landfills, and that placed on the generator who burns the material to recover its energy content. By contrast to the unregulated generator and the quasi-regulated landfiller, the operator of a high technology, but permitted, facility is subjected to an incredible variety of bureaucratic requirements. For example, there is testing which itself is highly expensive in terms of independent contractor costs and in-house expense, but is even more expensive in lost time from operation while one awaits the test results and EPA evaluation thereof. Even then, however, the facility may not begin operation because there must be a public hearing of adequate notice, which will inevitably stir up heated opposition from the community around the site and which, because of comment periods and bureaucratic concern engendered by the heated opposition always means a loss of several more months.

I did not give the above example for the purpose of arguing that the EPA has done anything wrong in its regulation of advanced treatment facilities, but to illustrate how time-consuming and expensive it is to be regulated. And that expense must be passed on to the customer. But you cannot compete for the customer's product if it can be placed in an essentially unregulated landfill or burned in a totally unregulated waste heat boiler. The regulatory climate fostered by the EPA is replete with such disparities.

It is our belief that high technology disposal alternatives are not inherently more expensive than landfilling. On an equal level of regulation, incineration for many products will actually be cheaper. If the landfiller is required to construct the landfill cell to state of the art standards to dispose of the collected leachate in an environmentally appropriate fashion, to cap the landfill cell properly when it has been filled and then, most importantly, to establish an adequate fund to insure the maintenance of that cell until its contents have become detoxified, then the two disposal methodologies can compete on an equal footing. But until the regulatory machinery is in place, and applied uniformly throughout the disposal industry, there is no incentive to construct high technology facilities. The latest studies of commercial hazardous waste management facilities indicate that non-land disposal facilities are operating at about half of their potential utilization rate. There may be some truth to the argument espoused by this adminstration that it cannot prohibit landfilling of all toxic waste which can be treated or destroyed because there is an inadequate treatment capacity to handle certain waste streams. Indeed, it almost appears that EPA deliberately set out to attain that end.

[The prepared statement of Mr. Robinson follows:]

TESTIMONY OF H. CLAY ROBINSON FOR THE HAZARDOUS WASTE TREATMENT COUNCIL TO HOUSE SUBCOMMITTEE ON NATURAL RESOURCES AGRICULTURE, RESEARCH AND ENVIRONMENT

November 30, 1982

I am Clay Robinson, general counsel to ENSCO, Inc., which operates a commercial, hazardous-waste incinerator at El Dorado, Arkansas, and I am appearing in behalf of a trade organization of which it is a member, the Hazardous Waste Treatment Council, which is comprised of companies engaged in the commercial disposal of toxic wastes by higher technological means of incineration, stabilization, detoxification, recycling and disposal. The Council has been organized to promote the environmentally sound treatment of toxic wastes.

The scientific evidence is overwhelming that there is no such thing as a "secure" landfill. Inevitably, any material in a landfill cell which is subject to leaching or being washed out of the cell in due course will be. The EPA recognizes this fact. For example, on February 5, 1981 in the Federal Register the EPA noted that liquid "inevitably leaks out of the land disposal facilities and migrates into underlying soils and groundwater unless a containment system is constructed and permanently maintained," however, the agency continued, seriously questioning "whether such systems can be maintained and operated for long periods of time." Nonetheless, more than six years after the adoption of the Resource Conservation and Recovery Act ("RCRA"), the EPA has still not published regulations to prohibit from landfilling toxic substances which will readily migrate from a landfill cell.

Not only has the failure of the EPA to promulgate appropriate regulations unnecessarily endangered American citizens, but it has had a chilling effect upon the development of higher technology alternatives to landfilling.

One would have supposed that the adoption of RCRA, promising as it did significantly more stringent regulation of the disposal of toxic wastes, would have lead to a boom in the development of alternative treatment facilities. Such has not been the case. I do not believe that there has been even one commercial toxic waste incinerator which has been initiated and placed in operation since 1976. I will attempt in these comments to express my opinion of why that is the case.

To begin with, the construction of a high technology facility requires a large amount of capital. Furthermore, a great deal of that capital must be invested with the prospect of years of waiting before it can begin to generate a profit. Because of these two factors, disposal of toxic wastes by high technology means costs more than does unregulated landfilling. Therefore, there cannot be an economic return on the invested capital for such a facility so long as toxic waste which can be readily incinerated, treated or stabilized is nonetheless directed to landfills because they are cheaper. Apparently it has been the perception of those who might have invested the capital that the EPA is unwilling to adopt a set of regulations which will result in high technology disposal being an economically viable alternative.

Why is that the perception? One can start with the fact that the landfill regulations were a full six years in preparation. Then one continues with the fact that those regulations as adopted after that six year hiatus do not prohibit the landfilling of bulk liquids, do not prohibit the landfilling of readily leachable toxic materials, and indeed exempt from any significant regulation for an unknown period of time a substantial portion of the existing landfill facilities. The exemption provides that the "existing portion" of an interim status landfill need not install liners or leachate collection systems until Part "B" of its permit is, in the phasing of the EPA, "called in". That does not sound like a serious exemption until one understands that by "existing portion" the EPA means all land that was described in the Part "A" application. This means that there is a landfill, for example, in the State of Alabama where, I have heard it estimated, fifty percent of the commercial toxic waste disposal east of the Mississippi is now occurring, and has hundreds of acres included in its "existing portion" will not be meaningfully regulated for a period up to five years, that being the period of time which EPA estimates will be required for the calling in of all of the Part "B" applications for landfills. I add that the EPA is probably correct in its position that it makes no sense to require the retrofitting of partially filled cells with a liner and leachate collection system, but there can be no justification for the EPA's refusal to require that unopened cells of "existing portions" be constructed to state of the art standards.

There are other lacunae in the present status of the regulation of the disposal of toxic wastes. For example, approximately one-half of all such wastes which are subject to incineration are totally exempt from regulation. Those wastes are being disposed of by the generator through a waste heat boiler or are being shipped to a blender, who, supposedly, mixes them with fuel oil which blend is then sold for use in heating units. This fifty percent of wastes subject to incineration is totally unregulated -- it is not manifested, there are no reports made on its disposal, the waste heat boilers and other heating units have never been tested, for the most part the gases generated by the burning are not scrubbed, and in general there is none of the bureaucratic machinery to which a regulated commercial disposer is subjected. This last point introduces what is probably the single most significant reason for the lack of investor enthusiasm for constructing high technology commercial facilities, and that is the disparity in the level of regulation to which such a facility is subjected as compared to that placed on landfills, and that placed on the generator who burns the material to recover its energy content. By contrast to the unregulated generator and the quasi-regulated landfiller, the operator of a high technology, but permitted, facility is subjected to an incredible variety of bureaucratic requirements④. For example, there is testing which itself is highly expensive in terms of independent contractor costs and in-house expense, but is even more expensive in lost time from operation while one awaits the test results and EPA evaluation thereof. Even then, however, the facility may not begin operation because there must be a public hearing upon adequate notice, which will inevitably stir up heated opposition from the community around the site and which, because of comment periods and bureaucratic concern engendered by the heated opposition always means a loss of several more months.

I did not give the above example for the purpose of arguing that the EPA has done anything wrong in its regulation of advanced treatment facilities, but to illustrate how time-consuming and expensive it is to be regulated. And that expense must be passed on to the customer. But you cannot compete for the customer's product if it can be placed in an essentially unregulated landfill or burned in a totally unregulated waste heat boiler. The regulatory climate fostered by the EPA is replete with such disparities.

It is our belief that high technology disposal alternatives, are not inherently more expensive than landfilling. On an equal level of regulation, incineration for many products will actually be cheaper. If the landfiller is required to construct the landfill cell to state of the art standards, to dispose of the collected leachate in an environmentally appropriate fashion, to cap the landfill cell properly when it has been filled and then, most importantly, to establish an adequate fund to insure the maintenance of that cell until its contents have become detoxified, then the two disposal methodologies can compete on an equal footing. But until the regulatory machinary is in place, and applied uniformly throughout the dispoal industry, there is no incentive to construct high technology facilities. The latest studies of commercial hazardous waste management facilities indicate that non-land disposal facilities are operating at about half of their potential utilization rate. There may be some truth to the argument espoused by this Administration that it cannot prohibit landfilling of all toxic waste which can be treated or destroyed because there is an inadequate treatment capacity to handle certain waste streams. Indeed, it almost appears that the EPA deliberately set out to attain that end.

Mr. SCHEUER. Thank you very much.

Now we will hear from Dr. Charles Johnson, technical director of the National Solid Waste Management Association.

Dr. JOHNSON. My name is Dr. Charles A. Johnson. I am technical director of the National Solid Wastes Management Association, the Nation's major trade association representing the waste management industry.

I have a Ph. D. in chemical engineering and I am also a registered professional engineer in the State of New York.

I am testifying today on behalf of a group of companies that participate in all aspects of management of hazardous and nonhazardous wastes. Members of NSWMA's Institute of Chemical Waste Management are companies that specialize in disposal of chemical waste materials, some of which are now classed as hazardous.

Treatment techniques are available that can be used to lessen the hazardous characteristics of wastes. Almost without exception, however, treatment processes themselves produce wastes to be disposed of. Some end products of hazardous waste treatment processes are nonhazardous. Often however, the products are hazardous but to a lesser degree. In either event, the waste products must go somewhere. At present, disposal on or in the land is the primary option available.

After I prepared this testimony, I happened to come across a gentleman who is in the business of treating waste oil. He is in the oil products, sells lubricating and hydraulic oils and ancillary to his primary business, he also collects waste oils from is customers, reprocesses them into a high-quality lubricating oil and sells that as well. Out of every 100 gallons of waste oil he takes in, he produces 86 gallons of salable lubricating oil product. The other 14 gallons ends up as part of a residue consisting of clays, acids, and the oil. That residue is disposed of in a secure chemical landfill at a total cost of disposal based on high-finished product of 21 cents per gallon, based on a gallon of produce he sells. It is actually much more than that, of course, on the basis of each gallon of waste disposed of. If he were required to incur the increase in costs needed to futher treat that material, he would be no longer able to conduct the reprocessing at all, and, therefore, the 100 gallons which he receives in the first place would go untreated. That anecdote serves to make my point. The land disposal or disposal in a economical manner is essential to waste treatment.

Our industry has long advocated strict regulation of hazardous waste management practices, including land disposal to protect public health and the environment. Only a strong Federal program can restore public confidence that hazardous waste management can be done safely and convince the public to accept the existence of storage, treatment, and disposal facilities. To this end, 4 years ago we joined several environmental groups in filing suit against EPA because of the failure of the Agency to promulgate these regulations according to the timetables demanded by the Congress when RCRA was enacted in 1976. The Federal regulatory program should be enforced uniformly and universally regardless of ownership of the facility or source of the waste. Facilities located on the property of the generator of the waste should be subject to the same regulations as those located offsite, publicly owned facilities, and I include those owned by the privately owned facilities.

We are very concerned about the promptness with which the land disposal relations will take effect by issuance of permits to existing facilities. There are reports that it will take 10 years or more before all facilities with interim status will receive their final permits. This is very, very unsatisfacory to us. The Institute of Chemical Waste Management has urged that EPA call part B permit applications for all facilities now operating under interim status immediately upon the effective date of regulation so that all facilities can at least begin the permitting process. Also, in our formal comments on the land disposal regulations we called for certain of the land disposal standards for permitted facilities to take effect for expansion of existing facilities operating under interim status in advance of award of final permit.

Turning to the land disposal regulations themselves, we endorse EPA's liquid management program as one of the principal elements of the protection of ground water from contamination from land disposal facilities. The program, applicable where there is ground water of sufficient quality and quantity to warrant protection, calls for minimizing the amount of liquids allowed to enter, the landfill during its operating life, removing and treating any liquid that does enter and closing the facility so as to prevent entry of liquid after closure. We do have some disagreements with the Agency on specifics of that program.

We disagree with EPA's policy of allowing placement of bulk liquid waste in a landfill equipped with a liner and leachate collection system and have so indicated in our comments. Disposal of bulk liquids in a landfill is incompatible with the element of EPA's liquid management program that would require minimizing the amount of liquids allowed to enter the facility. Disposal of bulk liquids in a landfill should not be allowed. EPA has done a good job of explaining and analyzing the roles of liners and leachate collection systems in protecting ground water against contamination from land disposal facilities. The liner functions primarily during the operating life of a site and the period immediately after closure when the infiltration cap is in place and the site is being dewatered. Unfortunately, EPA places far too much reliance on synthetic liners and too little reliance on natural or recompacted clays. Synthetic liners are thin films of plastic materials that in concept are impermeable to liquid. Plastic liners are relatively new in application for landfills. The quality of the barrier they provide depends completely on the quality of the installation, far more than the liner material itself. A tiny puncture in a critical location can completely void the protective element. We have discussed this more in our formal comments. I will leave you a copy of that for the record.

Mr. SCHEUER. Thank you.

Dr. JOHNSON. In the United States there are a few unique locations where there is no usable ground water. The potential for contaminating ground water at those locations is nil and the siting of land disposal facilities in those locations should be encouraged. Unfortunately, several sections of EPA's regulations actually discourage use of these superior locations. If the owner/operator wishes to site a facility at a location with natural protective features, you must show in advance that the ground water must be protected for all future time. Will it be possible to prove absolutely that there will be no contamination of ground water forever? EPA concedes that making such a showing may be impossible. Unless the operator can make this unprecedented showing, he cannot take advantage of the unique natural site. The owner/operator of a land disposal facility that uses manmade liners and leachate collection to contain and remove leachate is responsible for assuring protection of ground water for the operating life of the facility plus a postclosure period of 30 years. This is one of several ways in which the regulation in effect discourages use of what we consider to be the best natural locations for land disposal facilities.

The ground water protection, 40 CFR 264, subpart F, is the second element of EPA's control strategy. Unfortunately, it is in this area where EPA's technical data base is its weakest. Some of these deficiencies are highly technical—lack of standardized analytical methods for some hazardous constituents, failure to specify or even suggest a statistical method for evaluating compliance monitoring data and failure to adequately define the terms "aquifer" and "ground water." We have covered these in our formal comments to the Agency and I will not discuss them further this morning.

The greatest deficiency in the program, in our opinion, is the absence of environmental standards for all but the 14 substances for which there are interim primary drinking water standards. Only for eight metals and six pesticides are there quantitative numerical limits on the concentrations allowed in ground water. For the hundreds of other hazardous constituents, EPA's standard is no increase over background.

Many of the hazardous constituents are used extensively and are routinely discharged to other environmental media—surface water, air, or the oceans—by persons using them. An example is the class of materials known as halogenated organics—specifically chlorinated methanes, ethanes, and ethylenes. These are widely used as paint strippers, degreasers, dry cleaning fluids, and industrial solvents. They are used to unplug septic systems clogged with grease. Not surprisingly these compounds are commonly detected in public and private water supplies. There should be numerical limits on the concentrations of these and any other hazardous constituents sometimes found in drinking water. The zero increase over background limits applicable to this one activity only—disposal of wastes—is unjustifiable.

Another problem with zero increase as a standard is that it presents a moving target. A decade ago routine chemical analysis could detect materials in the parts-per-million range. Today it is parts per billion. Analyses in the parts-per-trillion range and even lower are possible for some substances. Under the zero increase standard, it is likely that facilities in compliance today will be out of compliance tomorrow for no other reason than that of a more sensitive analytical instrument will have been devised.

The job of standard setting has been assigned to EPA by the Congress and the Agency has failed to complete that essential task.

Finally, let me mention one area the Agency should consider for future revisions to the regulations. There are some substances that should not be disposed of in landfills. The State of California has taken a leadership role on this issue and has proposed regulations that would prohibit landfilling of certain waste materials within its borders. Specific wastes that would be covered are those with potential to migrate, are persistent—that is, do not degrade—and are bioaccumulative with regard to chronic toxicity. These are wastes that, if they were to escape a secure land disposal facility, would present an unacceptable risk to the public. To that list of criteria we would add certain acutely toxic wastes that present unacceptable risk to the employees of a waste disposal facility. We do have a major difference with California: A prohibition on future disposal should take effect at the time a practice is found to threaten public health or the environment, not several years in the future as with California.

In conclusion, the waste service industry is committed to a program of strict environmental regulation for the land disposal of hazardous waste. We feel that the EPA program aimed at limiting the amounts of liquids destined for land disposal is right on target and deserves public and congressional support. We have some technical problem with the regulations as written and encourage EPA to make changes as we mentioned today and as we point out in greater detail in our written comments to the Agency. I am submitting for the record both our comments to the Agency and our comments on the California proposal to restrict land disposal for certain hazardous wastes. I would be pleased to respond to any questions you may have.

[The prepared statement of Dr. Johnson follows:]

National Solid Wastes Management Association
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Statement Of
Dr. Charles A. Johnson
Technical Director
NATIONAL SOLID WASTES MANAGEMENT ASSOCIATION

On
EPA Hazardous Waste Land Disposal Regulations

Before The
Subcommittee on Natural Resources, Agriculture Research
and Environment
Committee on Science and Technology
U.S. House of Representatives

November 30, 1982

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My name is Dr. Charles A. Johnson. I am Technical Director of the NATIONAL SOLID WASTES MANAGEMENT ASSOCIATION, the nation's major trade association representing the waste management industry. I am testifying today on behalf of a group of companies that participate in all aspects of management of hazardous and non-hazardous wastes. Members of NSWMA's Institute of Chemical Waste Management are companies that specialize in disposal of chemical waste materials, some of which are now classed as hazardous. The public tends to think of the chemical industry and other heavy industries as the source of these wastes but in fact they come from hundreds of thousands of generators across the country such as paint shops, dry cleaners, schools, hospitals and many government installations. Dirt contaminated with chemicals as the result of accidents or improper waste disposal practices may be a hazardous waste along with many surplus or defective products.

Treatment techniques are available that can be used to lessen the hazardous characteristics of wastes. Almost without exception however treatment processes themselves produce wastes to be disposed of. Some end products of hazardous waste treatment processes are non-hazardous. Often however the products are hazardous but to a lesser degree. In either event, the waste products must go somewhere. At present, disposal on or in the land is the primary option available.

Treatment for the sake of treatment does not make sense. Treatment is a viable waste management option provided it results in a safer, ultimate disposal practice. If the disposal of the treated product is no safer than the disposal of the untreated product, treatment is unnecessary.

Even the strongest advocates of treatment processes for dealing with hazardous wastes concede the need for land disposal facilities. You will find upon examination that companies operating treatment facilities ultimately use land disposal facilities for the final residue. Many companies including members of the Institute of Chemical Waste Management operate both treatment and land disposal facilities.

Our industry has long advocated strict regulation of hazardous waste management practices including land disposal to protect public health and the environment. Only a strong federal program can restore public confidence that hazardous waste management can be done safely and convince the public to accept the existence of storage, treatment and disposal facilities. To this end, four years ago we joined several environmental groups in filing suit against EPA because of the failure of the Agency to promulgate these regulations according to the timetables demanded by the Congress when RCRA was enacted in 1976. The federal regulatory program should be enforced uniformly and universally regardless of ownership of the facility or source of the waste. Facilities located on the property of the generator of the waste should be subject to the same regulations as those located off-site. Publicly-owned facilities, and I include those owned by the federal government, should be regulated as strictly as privately-owned facilities. The danger to public health and the environment of improper waste disposal does not depend upon the source of the waste or who operates the disposal facility.

We are very concerned about the promptness with which the land disposal regulations will take effect by issuance of permits to existing facilities. There are reports that it will take ten years or more before all facilities with interim status will receive their final permits. The Institute of Chemical Waste Management has urged that EPA call Part B permit applications for all facilities now operating under interim status immediately upon the effective date of the regulation so that all facilities can at least begin the permitting process. Also, in our formal comments on the land disposal regulations we called for certain of the land disposal standards for permitted facilities to take effect for expansion of existing facilities operating under interim status in advance of award of final permit.

Turning to the land disposal regulations themselves, we endorse EPA's liquid management program as one of the principal elements for the protection of groundwater from contamination from land disposal facilities. The program, applicable where there is groundwater of sufficient quality and quantity to warrant protection, calls for minimizing the amount of liquids allowed to enter the landfill during its operating life, removing and treating any liquid that does enter and closing the facility so as to prevent entry of liquid after closure. We do have some disagreements with the Agency on specifics of that program.

We disagree with EPA's policy of allowing placement of bulk liquid waste in a landfill equipped with a liner and leachate collection system and have so indicated in our comments. Disposal of bulk liquids in a landfill is incompatible with the element of EPA's liquid management program that would require minimizing the amount of liquids allowed to enter the facility. Disposal of bulk liquids in a landfill should not be allowed. EPA has done a good job of explaining and analyzing the roles of liners and leachate collection systems in protecting groundwater against contamination from land disposal facilities. The liner functions primarily during the operating life of a site and the period immediately after closure when the infiltration cap is in place and the site is being "dewatered". Unfortunately EPA places far too much reliance on synthetic liners and too little reliance on natural or recompacted clays. Synthetic liners are thin films of plastic materials that in concept are impermeable to liquid. Plastic liners are relatively new in application for landfills. The quality of the barrier they provide depends completely on the quality of the installation, far more than the liner material itself. A tiny puncture in a critical location can completely void the protective element. An imperfect seam can leave a hole of major proportion. The question of chemical compatibility of the liner with contaminated leachate has been examined only superficially. EPA's rules would accept a landfill with a plastic liner placed directly over a highly permeable base such as sand. We think synthetic liners should be backed up with clays to provide a second measure of protection from leachate permeation. Moreover we believe clay liners by themselves should be allowed when the wastes to be accepted are compatible with clay liners.

In the United States there are a few unique locations where there is no usable groundwater. The potential for contaminating groundwater at those locations is nil and the siting of land disposal facilities in those locations should be encouraged. Unfortunately, several sections of EPA's regulations actually discourage use of these superior locations. If the owner/operator wishes to site a facility at a location with natural protective features you must show in advance that the groundwater must be protected for all future time. Will it be possible to prove absolutely that there will be no contamination of groundwater forever? EPA concedes that making such a showing may be impossible. Unless the operator can make this unprecedented showing, he cannot take advantage of the unique natural site. The owner/operator of a land disposal facility that uses man-made liners and leachate collection to contain and remove leachate is responsible for assuring protection of groundwater for the operating life of the facility plus a post-closure period of thirty years. This is one of several ways in which the regulation in effect discourages use of what we consider to be the best natural locations for land disposal facilities.

The groundwater protection, 40 CFR 264, subpart F, is the second element of EPA's control strategy. Unfortunately it is in this area where EPA's technical data base is its weakest. Some of these deficiencies are highly technical--lack of standardized analytical methods for some hazardous constituents, failure to specify or even suggest a statistical method for evaluating compliance monitoring data and failure to adequately define the terms "aquifer" and "groundwater". We have covered these in our formal comments to the Agency and I will not discuss them further this morning.

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Many of the hazardous constituents are used extensively and are routinely discharged to other environmental media--surface water, air or the oceans--by persons using them. An example is the class of materials known as halogenated organics--specifically chlorinated methanes, ethanes and ethylenes. These are widely used as paint strippers, degreasers, dry cleaning fluids and industrial solvents. They are used to unplug septic systems clogged with grease. Not surprisingly these compounds are commonly detected in public and private water supplies. There should be numerical limits on the concentrations of these and many other hazardous constituents sometimes found in drinking water. The zero increase over background limits applicable to this one activity only--disposal of wastes--is unjustifiable.

Another problem with zero increase as a standard is that it presents a moving target. A decade ago routine chemical analysis could detect materials in the parts per million range. Today it is parts per billion. Analyses in the parts per trillion range and even lower are possible for some substances. Under the zero increase standard, it is likely that facilities in compliance today will be out of compliance tomorrow for no other reason than that of a more sensitive analytical instrument will have been devised.

The job of standard setting has been assigned to EPA by the Congress and the Agency has failed to complete that essential task.

Finally let me mention one area the Agency should consider for future revisions to the regulations. There are some substances that should not be disposed of in landfills. The State of California has taken a leadership role on this issue and has proposed regulations that would prohibit landfilling of certain waste materials within its borders. Specific wastes that would be covered are those with potential to migrate, are persistent (i.e., do not degrade) and are bioaccumulative with regard to chronic toxicity. These are wastes that, if they were to escape a secure land disposal facility, would present an unacceptable risk to the public. To that list of criteria we would add certain acutely toxic wastes that present unacceptable risk to the employees of a waste disposal facility. We do have a major difference with California: A prohibition on future disposal should take effect at the time a practice is found to threaten public health or the environment, not several years in the future as with California.

In conclusion, the waste service industry is committed to a program of strict environmental regulation for the land disposal of hazardous wastes. We feel that the EPA program aimed at limiting the amounts of liquids destined for land disposal is right on target and deserves public and Congressional support. We have some technical problems with the regulations as written and encourage EPA to make changes as we mentioned today and as we point out in greater detail in our written comments to the Agency. I am submitting for the record both our comments to the Agency and our comments on the California proposal to restrict land disposal of certain hazardous wastes. I would be pleased to respond to any questions you may have.

Mr. SCHEUER. Thank you very much. We are going to go back and forth between the majority and the minority and hope to stick to the 5-minute rule.

My first question, Mr. Palmer, concerns your statement that CMA is convinced that landfilling of most hazardous wastes can be done in an environmentally sound manner, and that you acknowledge the need to reduce dependency on landfills. If landfilling can be done in an environmentally acceptable manner, why do you feel that there is a need to reduce dependency on landfills?

Mr. PALMER. I said it could be done in an environmentally sound manner taking into account the whole system, which ultimately requires that people be responsible, the generator, the disposer be responsible for long term maintenance of cover and potentially for cleanup of ground water. It can be done. Certainly if there are ways to minimize the possibility of having to do this, we would be better off, and so we should tend toward minimizing landfill.

Mr. SCHEUER. Dow Chemicals publicly has issued a statement that if recycle and reuse is not acceptable for hazardous waste then and then only should land disposal be considered an alternative. Does your organization support and follow this policy?

Mr. PALMER. In the written statement we talk about that somewhat more, but I see no difference between Dow's basic philosophy and that of the industry, in that in the sense where we can reuse we will do it, where treatment is practical we will do it, and the word "acceptable" takes into account whether it makes sense or not. So we are headed toward the same basic reuse, treatment where it makes sense, and disposal as a final option.

Mr. SCHEUER. What specific initiatives has the chemical industry taken to reduce dependency on landfill?

Mr. PALMER. It has been certainly on a company-by-company basis, but I think that the companies within CMA are cognizant of the problems we have been discussing today, and I think they are moving toward this on a voluntary basis.

Mr. SCHEUER. Mr. Carney.

Mr. CARNEY. Thank you, Mr. Chairman.

Dr. Johnson, you mentioned that there are certain natural facilities that should be encouraged for landfill because of their natural ability to protect ground water, that type of thing, from leachates getting into them. Can you identify any of those facilities, and could you give us an idea of what makes up a facility of that nature?

Dr. JOHNSON. I would rather identify them generically than specifically, because I do not pretend to pass judgment on individual facilities. Generally speaking there are two criteria. No. 1 is that there is no ground water that is either present in sufficient quantity or sufficient quality to be utilized, or second, that the ground water that is present already is in a sense written off, as Mr. Miller described in the last panel. I realize that concept may be a little difficult to accept, but the fact of the matter is that there are areas where the ground water is irretrievably contaminated, and it seems to us that these make logical sense for future disposal facilities rather than risking potentially contaminating new ground water.

Mr. CARNEY. There are only so many facilities. Do you think that most areas of our country or our Nation could be serviced by them?

Dr. JOHNSON. I do not think enough that you could expect to find one in every State. I am sure there are States in which there will be no such locations. However, I do not think transportation waste is that big a difficulty as perceived. Wastes are being transported hundreds or thousands of miles to a proper disposal facility to be sure that the disposal is done properly, soundly, and permanently. So proximity I do not think is a necessary criterion for that.

Mr. CARNEY. Would your organization be inclined to provide to this committee a list of areas that would fill the parameters that you set before in the New England and New York region? I know you said that you would rather just do it generically, but maybe your organization could provide to us a list of areas that you would think would be suitable—I do not mean to put you on a spot.

Dr. JOHNSON. If you do not restrict me to the New England, I will be happy to.

Mr. CARNEY. Fine. I was just being parochial.

The one last thing, Dr. Johnson, on page 7 of your testimony you state the job of standard-setting has been assigned to EPA by Congress, and the Agency has failed to complete that essential task. Do you think it is possible for EPA to complete that task in a reasonable timeframe, given the types of studies that are necessary to set standards on toxics, that type of thing? I think we have discovered over the past 10 and 12 years that the pressures that EPA has been put under by Congress and by mandates of law to come up with solutions and come up with standards have forced them to come up with shoddy solutions and shoddy standards. Much of the science necessary to do the types of study require an enormous amount of time, sometimes generations of time. Do you feel that given the time and the wherewithal they could come up with standards?

Dr. **Johnson**. It is one of those situations where if you do not begin it will never be accomplished. I do not expect that there will be standards for 387 appendix 8 constituents perhaps within my working lifetime or perhaps even within my physical lifetime, but there are certain materials for which standards are so desperately needed that the Agency is—it is really incumbent upon them to begin. I mentioned the halogenated methanes. It is my understanding that some movement in that direction may be under way. In the absence of standards we find the Agency itself and State agencies creating what are de facto standards, ad hoc standards, decided by people probably not qualified in the best sense to create those standards, created for the expedient need, I think somebody else mentioned to enable the world to continue to turn, and I do not think that practice is particularly desirable, and I concur and I welcome seeing somebody with the courage to say this is all right, but I do not think it is the proper way to proceed.

Mr. **Carney**. I think what you might be pointing out is that often we as a body of the Congress are compelled to set standards in that type of fashion and they are probably not accurate.

Dr. **Johnson**. I suspect that somebody is going to be establishing a standard for the allowable levels of dioxin in soils as a result of the recent revelations in Missouri.

Mr. **Scheuer**. Let me add a footnote. This criticism of EPA for its gross failure to set standards is not a partisan criticism, because it precedes this administration. RCRA was passed in 1976. I believe they gave the Agency 18 months to set standards, which was probably foolish. By 1980 they were 3 or 4 years behind schedule, so the fact that they are now 6 years behind schedule means that there has been a bipartisan failure of both the current and the preceding administration to address this problem intelligently and very possibly a failure of Congress more intelligently to narrow perhaps and define the kind of standard-setting they wanted. There is plenty of blame to go around on this thing, and it is not a partisan matter. I want to emphasize that.

Dr. **Johnson**. The standards that I was referring to specifically on page 7—I talked about standards for landfills in other parts, and that is what you were referring to—the standards I am referring to on page 7 are the standards for the allowable concentrations of chemical materials in drinking water and other waters. This is not the responsibility assigned to the Office of Solid Waste and Emergency Response by Congress under RCRA. This is a responsibility assigned under the Toxic Substances Control Act and the Safe Drinking Water Act that flops itself over into our area of concern today.

Mr. **Carney**. I feel in order to properly do that it is going to take an enormous amount of time, money, and science, time probably being the worst culprit here. With that in mind, Doctor, would you suggest that EPA go ahead and set temporary standards taking the conservative side for the protection of the population and then allowing the types of studies necessary that would take perhaps two or three generations to really determine what safe levels are to take place with less pressure—would it behoove Congress to give EPA that message? We know that in order to promulgate regulations, to set standards it might take 40 years of scientific determination, studies within two or three generations of the population, to accurately say this is a safe and accurate parameter for a certain toxic material. So should we go ahead and say to EPA, we recognize that, so what we want you to do is to set some temporary standard, using the conservative side of the available science, and then go forward, or should we continue to allow them to try to plow through this and hit and miss?

Dr. JOHNSON. I would love to see them have some standards, even if temporary and even if somewhat arbitrary. The problem is you used the word "conservative." EPA believes it has been conservative in establishing what it believes to be a standard of zero. If Congress were to impose such a requirement, I would impose it with a condition, that EPA, if you are willing or desirous of imposing a zero standard for a particular substance, you must at the same time prohibit the dispersing of that substance into the environment, even if it means prohibiting the manufacture of that substance. Now, this is not unprecedented. This has been done with PCB's, for example. This has been done to a lesser extent with refrigerant aerosols, not from a health standpoint, but for fear of disturbing the ozone layer. So it is not unprecedented to ban the production or use of a particular material in concert with the development of a standard. You cannot have zero unless you are willing to have zero.

Mr. CARNEY. I appreciate your remarks and I yield back my time to the Chair. Thank you, Doctor.

Mr. SCHEUER. Thank you.

Mr. Clay Robinson, your organization, the Hazardous Waste Treatment Council, represents companies that are engaged in commercial disposal of toxic waste by incineration, stabilization, detoxification, recycling, and disposal.

Mr. ROBINSON. This gentleman here represents a fixation company, so I want to get that into the record.

Mr. SCHEUER. What percentage of the total of hazardous waste produced in this country can be disposed of by these technologies? Are there some that simply cannot be disposed of by any technology?

Mr. ROBINSON. I do not know how we are ever going to know until the economics require that we try. As it stands, the regulations do not militate toward developing the technology, spending the money on the facilities to find out both as a development project, as they develop the technology, and to put in place to do these things. As long as landfilling is such a much cheaper alternative, these alternatives never will be developed. I think it is possible that nearly all substances now landfilled could be treated economically by some one of the variety of methods that are available somewhere. But again, until the EPA—the EPA has been so concerned about the economics, about not affecting industry adversely, that it has caused an enormous, I think, dislocation in the marketplace, which is the very thing it was attempting to avoid doing. If the regulations were just put in place and let the chips fall where they may, the marketplace will solve the problem.

Mr. SCHEUER. If the marketplace solved the problem, if EPA let the chips fall where they may, which of these treatment technologies would be used more intensively than they are being now? In other words, where is there unused potential and unused capacity if market forces were truly working?

Mr. ROBINSON. We have a study prepared this spring by Fred Hart that says that the alternative technology facilities are used right now at about 50 percent of capacity. This is the ones actually in place, not new facilities that would be built because there would be a demand. If EPA would simply implement the theories that it has had—I will not say the rules—I think at least that 50 percent of capacity would be placed in use, I think you would see a number of new facilities come onstream.

Mr. SCHEUER. Are there any of these hazardous wastes which these technologies cannot treat, and if there are, which are they and should these wastes be landfilled? Or should they be disposed of by some other technology that will be more effective?

Mr. ROBINSON. Well, you know, if you do not care what the cost is, obviously——

Mr. SCHEUER. Let me interrupt you there. We do care what the cost is. We want these technologies to be cost-effective. We do not want to load more burden on industry than is minimally necessary to do the job.

Mr. ROBINSON. That was my supposition. On a cost-meaningful basis, today there are substances which probably are not subject to being treated by one of the alternative technologies on a cost-effective basis.

Mr. SCHEUER. I would like you to provide the names of the substances for the record.

Mr. ROBINSON. We will do our best. I am not sure by the way that the EPA knows enough or we know enough necessarily to do that. I think that the substances will identify themselves.

Mr. MOSSHOLDER. I am Dr. Nelson Mossholder. I wanted to just respond briefly to that question because it is not only a question of the kinds of substances, but it is a matter of the concentrations and the environments in which the substances are found. PCB's in waste transformer oil are relatively inexpensive to dispose of by incineration. Put the same level of PCB's in soil and they become much more expensive to dispose of. So it is not a question of just which materials to treat, it is a question of where they sit and what concentrations they sit in.

Mr. SCHEUER. Congresswoman Claudine Schneider.

Mrs. SCHNEIDER. Dr. Johnson, we were talking a little bit earlier about some of the specific natural sites for disposal, and you had made the point that well, we are doing a lot of transportation of wastes. This panel has gotten into a discussion of costs, and I think that it is important to acknowledge the fact that transportation costs and other costs are so rarely incorporated into the equation as to the total cost of disposal of hazardous waste, and I would just like to make the point that transportation costs are one thing, but I think you are also seeing that there are a number of States that are requiring different containment rules and regulations for transportation across State lines. I wondered if your association or Mr. Palmer's association have done any analysis of the cost of transporting and ultimate disposal of hazardous wastes.

Dr. JOHNSON. If you—have we a study specifically on cost of hazardous waste transport?

Mrs. SCHNEIDER. And disposal.

Mr. JOHNSON. I would say no, and I would say no to the latter as well. In the former case it is a relatively straightforward study, because while it is not the same as transporting garbage, the level of sophistication and permits are greater, it basically comes down to a matter of time and distance. As far as disposal is concerned, the costs have been increasing in general at such a rapid rate as to make any study of little time value. I think there may have been some leveling in the past year or so because this market, like most markets, in the country are soft at the present time, but I would imagine that the upward trend would continue.

By way of an anecdote, my friend who is in the oil reprocessing business told me that approximately a little more than a quarter of his cost—he sees transportation and disposal, he does not distinguish which is which. He pays the bill leaving his gate. But he is able to determine that roughly a little more than one-quarter, 30 percent approximately of his costs are transportation, and roughly 70 percent are disposal, and that disposal facility, if I had to estimate, was approximately 300 miles from his facility.

Mrs. SCHNEIDER. Well, part of the reason that my colleagues, Mr. Carney and Chairman Scheuer and I are so parochial is it just so happens that we do happen to have some very serious toxic-waste problems in our districts, and we are primarily interested in a list of natural sites. Even though you said not just New England, that is my priority, and granted you can give it to us for the rest of the United States, too, but we have to consider for a Rhode Island manufacturer to ship his waste to Louisiana or Oregon or whatever increases the costs. Perhaps when one does the total cost-benefit analysis one would find that the best way of doing it is not to put it in a natural site but rather to chemically treat it or, as was mentioned by the gentleman from OTA, to prevent the actual generation of some of those wastes to begin with. So I think that when we are making decisions, it appears that we have to monitor the actions of EPA, but many of their decisions are based on cost-benefit analysis, given the current economy that we are having to deal with.

Dr. JOHNSON. I think to support your argument and the argument of everybody at this table, the marketplace will make the decision. It is up to EPA to assure that whatever option is chosen protects the public and the environment. I think as a practical matter, considering not only the distance but also the types of wastes, the wastes generated in New England for the most part are going to be subject to some form of treatment prior to whatever other disposal occurs. It is just the nature of the waste and the distance.

Mrs. SCHNEIDER. Mr. Palmer, do you have any study that your association has produced on the costs of disposal of hazardous wastes?

Mr. PALMER. We have not done any studies on this. Most of our wastes are really disposed of on site. However, from personal experience, contracts are quite often written with disposal and transportation costs assumed together and not broken out, so sometimes it is hard to get that number. From personal experience, transportation can be up to 50 percent of the cost.

Mrs. SCHNEIDER. You see, it is very discouraging for us who are in decisionmaking positions to have industry come before us and say we do not want to be regulated because it is too costly and then not have you gentlemen be able to provide us with a cost analysis, when in fact the information that we accumulate provides for the cost of a whole series of things. It provides for the cost to public health, it provides for the cost of transportation, the cost of monitoring, the cost of ultimate disposal, a whole broad spectrum of things, and so I have become a great disbeliever, unless you gentlemen can persuade me otherwise with some facts and figures. The generality of saying too costly does not cut it.

Mr. PALMER. Some are forthcoming because of EPA's 10- or 20-percent study of the industry which goes into great detail as to cost breakdowns. This will be forthcoming in about a year. Industry has not developed its own figures because we believed at the time that their study would give us the information we need.

Mr. ROBINSON. I suspect that if EPA would set technology standards that the costs would take care of themselves. If the transportation cost is too high from X place to Y place, someone will spend the money to put in a facility if the technology standard is there. If EPA, however, does not set the technology standards—you are talking about so many imponderables in these things, that the only place where all these imponderables can be put together and solved is in the marketplace.

Mr. CARNEY. If I may, and I appreciate my colleague from Rhode Island yielding. I know she has a problem in her own district. Pachillo Pig Farm up in Rhode Island—we are looking at this cost factor as if it is not important. One of the problems we have right now, and EPA's regulations, as everyone here will agree I am sure, everyone on the panel and the witnesses we had this morning would agree, the regulations are not adequate at this point. One of the problems we have is with the existing regulations that we have now, it is often easier for someone to dump their toxic wastes to avoid the cost of putting them in a safe place under existing regulations. If we promulgate regulations that become stiffer, more expensive, we are going to have midnight dumping around this Nation like you have never seen. That is our biggest problem. The reason we have 50,000 toxic waste sites is because many were generated by midnight dumping because of the costs associated with safe dumping of toxic waste—we have to find ways to do this economically. I would not want anybody to go away from this hearing thinking that we have technologies that are economical at this particular point to many industries.

Mr. SCHEUER. I do not generally get into a colloquy with my colleagues, but I have to say for the record that I question that logic. If EPA standards would have to compete with midnight dumping to be acceptable, we would never have standards at all. We have midnight dumping not because the standards are too strict but because we have not had any enforcement or policing. We let these companies get away with murder.

Mr. CARNEY. I did not say that. I simply said that if the cost associated with disposing adequately of hazardous waste continues to go up, the midnight dumping is going to continue. What we have to do is find economical technologies to safely dispose of these wastes.

Mr. SCHEUER. What we have to do is to consider the transportation and disposal of these toxic substances as a lifetime cycle part of the total cost of producing the chemical product. And if that cost is too high, then those companies should not be producing that chemical. Then maybe that chemical should not be used in our society. And midnight dumping is a criminal offense and it ought to be treated as a criminal offense and we ought to have policing of it.

Mr. CARNEY. I am saying if we want to stop it, we must make it economically possible for the manufacturers of hazardous waste to dispose of it. I think what might have happened here is leading some people to believe that there are alternate technologies that today are economically feasible. I do not believe that to be the case, and that is where we have to work. That is where Mr. Robinson's group has to work to continue to find methods to dispose of these horrible wastes in a fashion that people can afford. And if we do not, Mr. Johnson was right, and yourself, Mr. chairman. We have to discontinue the manufacturing of some of these wastes. But what I would hope that we could find is some type of stimulus to move on with the technology and not try to just find out who the blame belongs to—it is more important that we find the technologies and move forward in that area so we solve the problem. The blame is easy. The problem-solving is hard. I think you and I agree, Mr. Chairman.

Mrs. SCHNEIDER. If I might reclaim my time and then some. I am glad my question was so stimulating to you folks. Mr. Robinson, I would like you to comment on that, please.

Mr. ROBINSON. I, really, think the problem is simpler than we are making it. For example, I find myself sitting here next to the landfilling—this group primarily are landfillers. We primarily are higher technology. They have some of the other, as do we in our group. I find that we are saying to you exactly the same thing. That one thing that is in the regs now that absolutely ought to be prohibited, and everybody on this two-thirds of the table agrees, is liquids. If you would prohibit the landfilling of bulk liquids, I suspect you would take care of 90 percent of the problem. We can worry later about polishing up the regulations, finding out which ones of these 369 substances, how much. There are simple things that could be done tomorrow that would economically take care of a very large part of the problem.

Mrs. SCHNEIDER. Would you happen to have a digest of the various types of technologies available for treating different types of hazardous wastes, and a listing of where those facilities are located?

Mr. ROBINSON. Mrs. Schneider, we from inside our organization, which is not at all universal, can come up with what we have. I think the EPA has that quite completely.

Mrs. SCHNEIDER. Well, if I just might leave you gentlemen with a little case history. The State that I represent, Rhode Island, as you know is geographically very small, and if you cut that State in half, you have my district, so that makes it even smaller. Within my district I have three hazardous waste sites in the United States that have been designated as part of the 114 worst hazardous waste sites throughout the United States, which means that they are almost contiguous because we are so geographically small.

Now, the reason that we have some of these sites, as history has finally disclosed, is because there has been corruption in the process of disposing of hazardous waste. Many times it has been the result of different industries, first of all through ignorance and not knowing any better, but in recent history it has been through intentional disposal of waste trying to beat the system or to avoid the laws. What is interesting is that now the manufacturers in the State of Rhode Island—and we are the largest costume jewelry manufacturing State in the country; we also have a number of different chemical manufacturing plants—all of the businessmen, the chief executive officers that I meet with regularly, have clearly indicated to me that one of the highest economic, and I underline economic, priorities for the State of Rhode Island, must be to get a hazardous waste treatment facility. The reason for this is that all these small businessmen recognize that the cost may be high for taking care of their waste, but they live right next to the stream that they have been polluting for years. They live right beside the hazardous waste sites that have been spreading through either ground water pollution or through further development. And it has also come to the attention of the manufacturers and all the people of Rhode Island that we now have the highest cancer death rate in the United States. So, when one takes into consideration the high-pollution levels, not only from toxic waste sites or hazardous waste sites, but also from a number of other problems that we have environmentally, it is very clear that the businessmen are right now leading the charge to clean up the situation.

Now, I think that what we hear on a national level is that business certainly takes a bit of a different point of view, and it is not until we have a body count that they are willing to jump on the bandwagon. We have heard testimony already that the technology is available. What we are lacking is the economic argument, which seems to be the only persuasive argument outside of having dead bodies that will move the decisionmakers, whether it be the EPA or the Members of Congress. And so I think that it is important to take into consideration that there are places such as the Second Congressional District in Rhode Island where the manufacturers and the general public are most anxious to get the hazardous waste problem under control, and I think they recognize that the costs associated with this problem, whether it be in terms of business expenses, whether it be in taxes, whether it be in later cleanup of the problem, or whether it be in human health, are astronomical when you compare it to doing the job in the most technologically feasible way.

Dr. JOHNSON. I would like to comment on Rhode Island in another vein. One of the issues that our association has lobbied on extensively in recent months is to have Congress instruct EPA to eliminate the exemption from regulation for generators of so-called small quantities of hazardous waste, generators of less than 1,000 kilograms per month of hazardous waste. I understand that Rhode Island has taken its own initiative and has completely removed the exemption, and all hazardous wastes in Rhode Island are subject to regulation. We are with you.

Mrs. SCHNEIDER. That is correct. It has worked in our State, and I think that it certainly has the potential for working on the national level.

Dr. MOSSHOLDER. Mr. Chairman, I really would like to tell you a little bit of a story, because my company has been attempting to site a facility in New England for over 2 years, and the primary reason that we have been unsuccessful has nothing to do with economics. First of all, let me start out by saying that we are really living proof of whether these regulations provide disincentives for innovative technology such as ours. We spent 5 years and many millions of dollars attempting to site facilities not only in New England but in Texas, in Michigan, and other parts of the United States, and we have yet to see our first dollar of revenue from it, that is revenue, not profit.

Our process chemically neutralizes many types of essentially inorganic hazardous waste that is very difficult to treat and impossible to destroy. We bind them in a solid which is a rocklike material of permeability as low as the standards for clay liners or hazardous waste treatment facilities. The EPA and the courts have both acknowledged and recognized that our process is capable of converting these hazardous waste materials into nonhazardous, commercially usable materials, and yet we still have been unable to get into business.

Mr. SCHEUER. Why?

Dr. MOSSHOLDER. The reason is we were not in business on November 19, 1980. We do not have interim status. In our filings and our permit applications we are being subjected to the full regulatory impact of RCRA, every "i" dotted and every "t" crossed, every issue fully discussed. At the same time, for the last 6 years, and presumably for the next 5, the people who were in business on November 19, 1980, solely because they were in business on that date, are being minimally regulated. That is the basic reason.

There is a secondary reason as well. That is, we have to comply not only with the full regulatory impact of RCRA, but we also have to comply with sometimes widely diverging State regulations. For instance, the EPA recently granted a temporary delisting for our facility that we have proposed in the State of New Hampshire. That only gives us the right to start again with the State. That is not binding on the State. We have had permanent applications in the State of New Hampshire and in region 1 of EPA for 2 years. They have yet to act on them. The difficulty has been that New Hampshire has been about to receive interim authorization under the RCRA program for the last year, and so EPA has not wanted to act and preempt the State of New Hampshire. The State of New Hampshire has not got interim authorization, so nothing has happened.

Mr. SCHEUER. I have one last question to ask the panel. You are all familiar with the California plan. It has been proposed to ban certain hazardous wastes from land disposal. Do you think that this plan is sufficiently stringent in reducing the environmental dangers of land disposal of hazardous waste, and do you feel that the plan is more or less applicable nationally to the phaseout of land disposal of certain hazardous wastes? Any volunteers?

Mr. PALMER. I think when the plan was first broached in California, CMA was skeptical because of some of the considerations that I put in my written testimony. But California has come a long way in recognizing some of the problems in their initial proposals and has come out with a reasonably workable scheme as it is presently put together. It is workable in that timetables are such that the more easily treatable and more commonly understood wastes are higher on the priority for treatment, and over a longer period of time they are tackling the more difficult-to-treat wastes and those for which they do not have much information and other technologies are actually available to do that. In that respect the plan is good.

It also recognizes one thing which I alluded to in my testimony, is that there has to be some safety valve if certain waste cannot be treated by the techniques that are mandated. And California does allow the State the set deadlines based on when they think technology will be available, but 45 days before that occurs they have to determine whether or not there is enough capacity in the State to substantially treat all the waste in that category. If there is not, they are allowed to defer that period until capacity comes on line. This puts a burden on people that are intending to get into the waste disposal.

One thing you have to understand also is that deadlines are very much dependent on the permitting process. Even though some waste treatment representatives might be able to put the facility on line physically within the time constraints of the California regulations, they have to go through a relatively substantial permitting process, and the process under RCRA is perhaps one of the most complex processes I have ever seen. Even for something as simple as a storage tank you have to give information down to the number of Band-Aids that are in your safety kit. It makes it very difficult for people to put the facilities in in a timely fashion. Given the permits that engineers are allowed to obtain showing that economic treatment is not available at the time of the ban, I think it is a workable system.

Mr. SCHEUER. Is it applicable nationally?

Mr. PALMER. I would think that the basic principles would apply nationally, yes.

Mr. SCHEUER. Anybody else?

Mr. Robinson.

Mr. ROBINSON. This is a personal feeling. It seems to me that the California plan suffers from the same defects that I see in the EPA regulations, and that is excessive complexity. It seems to me that what the regulatory authorities need to do is set out as few technology standards as will cover the territory, and then—and then allow the individual permitter to take care of the individual problems.

What we have is—you know, the more complex the regulations get, then the more complicated becomes the permitting process, the more holes that you are going to leave here and there simply because of the great complexity. There is no way that any lawmaking body, whether regulatory or congressional or whatever, can cover every single hole that could possibly exist in something as complex as American industry. And the more you try to hit all the different small points, the more—you know, the less effective the overall regulatory effort becomes.

To me, the California effort, although certainly—I guess it is the best that is going on right now in the country, perhaps, nonetheless, because of its complexity I question how effective it is going to be in operation. I think that they are going to run into the same problems in implementing it that EPA has run into again because of excessive complexity of the regulations.

Dr. JOHNSON. I think the question that you asked originally was would the California program provide a sufficient protective scheme for regulating land disposal around the country. The part of the program which received most attention was the ban on land disposal of certain specific and very specific wastes in California. That particular aspect of the program is neither complex nor difficult. It perhaps has a few glitches, but very few. But it is not a complete program. It does not ban all wastes. It bans a few specific waste materials that should not go into landfills. The great bulk of wastes are not banned from land disposal in California, but are subject to disposal in regulated land disposal facilities, and of far greater importance, in our view, are the regulations that apply to those facilities that are allowed——

Mr. SCHEUER. I asked if the California plan is sufficiently stringent to reduce the environmental dangers associated with land disposal of hazardous waste. That means is the plan working.

Dr. JOHNSON. Yes; but it has to be taken in its entirety.

Mr. SCHEUER. And taken in its entirety it is adequate to the job in California?

Dr. JOHNSON. It will be when the remaining pieces are in place. California is waiting for the standards information land disposal facilities. The ones that they have had in place for many years are not adequate.

Mr. SCHEUER. Assuming a new plan is adequate for California, will it be reasonably applicable nationally to the phaseout of land disposal of hazardous waste where it is not doing the job?

Dr. JOHNSON. I believe the portion of the plan unique to California that they have created is the ban on certain specific materials from land disposal, and I believe that portion is applicable to the entire country.

Mr. PALMER. May I add a comment?

Mr. SCHEUER. Yes.

Mr. PALMER. It does apply to specific materials. California has looked at materials with respect to things like persistence and mobility and come up with those wastes which they feel should not go in a landfill. They are primarily materials that are liquid in nature, which have high concentrations of seriously problematical components and which to a fair degree look treatable. I agree, I think when the program is in place it will do the job. It handles those things which really seem to be a problem in a landfill environment.

Mr. SCHEUER. This has been a very stimulating panel and we have imposed upon your patience too long, but it has been thought-provoking and it has been challenging. We appreciate your testimony very, very much. We are going to hold the record open for a week or 10 days to submit additional questions in writing to all of you, and we hope very much that you will get your answers back to us as expeditiously as you can. Thank you once again for this very, very fine panel and its testimony.

[Whereupon, at 11:45 a.m., the subcommittee was adjourned.]

EPA'S REGULATIONS FOR LAND DISPOSAL OF HAZARDOUS WASTES

WEDNESDAY, DECEMBER 8, 1982

House of Representatives,
Committee on Science and Technology,
Subcommittee on Natural Resources, Agriculture
Research and Environment,
Washington, D.C.

The subcommittee met, pursuant to call, at 10 a.m., in room 2318, Rayburn House Office Building, Hon. James H. Scheuer (chairman) presiding.

Mr. Scheuer. The Subcommittee on Natural Resources, Agriculture Research and Environment will come to order.

Today we are continuing our examination of EPA's regulations for land disposal of hazardous wastes. In particular, we plan to evaluate the technical validity of the EPA regulations with respect to ground water protection and to determine whether land disposal of certain hazardous wastes should be prohibited.

Mismanagement of hazardous waste land disposal facilities has seriously threatened public health and the environment. And it is my hope that both sides of the aisle can work together to resolve this problem. Admittedly, EPA's regulations are a welcome forward step in the safe management of hazardous wastes, but I have very serious reservations over the degree of long-term protection they will provide.

This past Tuesday, representatives of the scientific, technical, and industrial communities informed this subcommittee that we must reduce our dependence on land disposal for certain highly toxic chemicals, and to utilize to a greater extent existing alternative treatment technologies, such as incineration and detoxification.

We had planned to hear today from Ms. Rita Lavelle, Assistant Administrator of EPA's Office of Solid Waste and Emergency Response. As all of you know, it is the rules of the Congress that witnesses will have their testimony available to the committee 3 days before their scheduled appearance. As of 5 o'clock last night, we had not received Ms. Lavelle's statement, so we called her office and suggested that she not appear this morning and that she would be invited to appear whenever she could get her testimony to us, as a matter of amity and respect between the three equal branches of Government, and as is provided under the House rules, and was clearly stipulated in the correspondence inviting her to testify.

So we hope that before Congress adjourns next week, Ms. Lavelle and the Office of Management and Budget will be able to get their act together and achieve some consensus on her testimony, get it up here, and we will then schedule her testimony within a day or two. We are very hopeful that they will observe the rules of the Congress that we have defined over many, many years, to be sure that we are able to competently and effectively exercise our oversight responsibility over these serious matters.

Today we will hear from representatives of State government and environment organizations with respect to these regulations.

Before we go on to these witnesses—and we do expect some members of the minority to show up very soon—I would like to ask my distinguished colleague, Congressman Brown of California, for any remarks he may wish to make.

[Mr. Scheuer's opening statement follows:]

OPENING STATEMENT
HONORABLE JAMES H. SCHEUER
DECEMBER 8, 1982

THE SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH, AND ENVIRONMENT WILL COME TO ORDER.

TODAY WE CONTINUE OUR EXAMINATION OF EPA'S REGULATIONS FOR LAND DISPOSAL OF HAZARDOUS WASTES.

IN PARTICULAR, THE SUBCOMMITTEE PLANS TO EVALUATE THE TECHNICAL VALIDITY OF THESE REGULATIONS WITH RESPECT TO GROUNDWATER PROTECTION AND TO DETERMINE WHETHER LAND DISPOSAL OF CERTAIN HAZARDOUS WASTES SHOULD BE PROHIBITED.

MISMANAGEMENT OF HAZARDOUS WASTE LAND DISPOSAL FACILITIES HAS SERIOUSLY THREATENED PUBLIC HEALTH AND THE ENVIRONMENT AND IT IS MY HOPE THAT BOTH SIDES OF THE AISLE CAN WORK TOGETHER TO RESOLVE THIS PROBLEM.

ADMITTEDLY, EPA'S REGULATIONS ARE A WELCOME STEP FORWARD IN THE SAFE MANAGEMENT OF HAZARDOUS WASTES, BUT I HAVE VERY SERIOUS RESERVATIONS OVER THE DEGREE OF LONG-TERM PROTECTION THEY WILL PROVIDE.

THIS PAST TUESDAY, REPRESENTATIVES OF THE SCIENTIFIC, TECHNICAL, AND INDUSTRIAL COMMUNITIES INFORMED THIS SUBCOMMITTEE THAT WE MUST REDUCE OUR DEPENDENCE ON LAND DISPOSAL FOR CERTAIN HIGHLY TOXIC

CHEMICALS AND UTILIZE TO A GREATER EXTENT EXISTING ALTERNATIVE TREATMENT TECHNOLOGIES SUCH AS INCINERATION AND DETOXIFICATION.

TODAY WE HAD PLANNED TO HEAR FROM MS. RITA LAVELLE, ASSISTANT ADMINISTRATOR OF EPA'S OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, WHO WAS TO EXPLAIN AND DEFEND EPA'S LAND DISPOSAL REGULATIONS.

MS. LAVELLE, HOWEVER, HAS SEEN FIT TO WITHHOLD HER STATEMENT FROM THIS COMMITTEE IN DIRECT VIOLATION OF THE RULES GOVERNING THIS BODY.

MS. LAVELLE WILL BE CALLED BEFORE THIS COMMITTEE NEXT TUESDAY TO ADDRESS THE ISSUE AT HAND AND TO ACCOUNT FOR HER DISREGARD OF THE PURVIEW OF THIS COMMITTEE.

NEVERTHELESS, WE SHALL PROCEED TODAY BY HEARING THE VIEWS OF REPRESENTATIVES FROM STATE GOVERNMENT AND ENVIRONMENTAL ORGANIZATIONS WITH RESPECT TO EPA'S REGULATIONS.

Mr. BROWN. Thank you very much, Mr. Chairman.

I would not normally take the time for making a statement, but since you want to wait a few minutes for the minority to show up, I will read a short statement.

This review of the Reagan administration's land disposal regulations and the scientific basis for EPA's action on these regulations is certainly timely. Our Nation's hazardous waste problem is serious.

My own State of California is the fourth largest producer of hazardous wastes in the country, and I would expect our problem is very similar to most industrialized States. We have identified almost 100 sites where soil and water contamination threatens human health and the environment. Cleanup of these sites will require hundreds of millions of dollars and will take many years to complete.

Moreover, the State expects to find many more sites before it is finished with our county-by-county search. Many of these sites have contaminated drinking wells with solvents, pesticides, and other possibly carcinogenic materials. Once contaminated, it is very difficult and expensive to reclaim a poisoned aquifer and the natural rate of ground water recharge is on the order of decades and, in some cases, even longer than that. Over half of all U.S. citizens rely on ground-water aquifers for drinking water. Yet we continue to threaten that supply by relying on questionable land disposal practices.

It is time to turn off the faucet, to stop disposing highly toxic mobile persistent poisons in this Nation's landfills. It is time to retarget the purpose of land disposal to remove the economic incentives of low-cost, let-the-next-generation-clean-up approaches to handling our hazardous wastes. We can no longer afford to throw away many of the components of these hazardous wastes. This current direction both creates future sites for Superfund cleanup and wastes valuable raw materials.

The State of California, after a year long review of our hazardous waste disposal problems and needs, came to this same conclusion. I am, of course, looking forward to Mr. Stoddard's testimony on California's new program constructed to reduce, recycle, treat, or destroy specific portions of the State's hazardous waste stream.

However, States do suffer from limited resources and do not have funds to support much of the scientific data development necessary for accurate, efficient detection of harmful levels of hazardous waste. How EPA proposes to handle this imperative arm of hazardous waste management is of great interest to me. For that reason, I look forward to Ms. Lavelle's testimony with regard to their R&D program.

I thank you again for allowing me the time to express my support for the importance of these hearings.

Mr. SCHEUER. Thank you for that splendid statement, Congressman Brown.

We will now go ahead with the first panel, State government. In fact, I think we will do both panels at the same time because I would like to see some interaction between the State government witness and the environmental witness. So let's have all four of our witnesses. The first two will be representing State government.

First, Mr. Norman Nosenchuck, director of the division of solid waste, New York State Department of Environmental Conservation. Second, Mr. Kent Stoddard, project manager of the toxic waste assessment group, Governor's office of appropriate technology, State of California.

Third, we will have Mr. Melvin Goldberg of the New York Public Interest Research Center; and fourth, Ms. Linda Greer, science associate, toxic chemicals program of the Environmental Defense Fund.

We are delighted to have you all. We will ask each of you to sum up your testimony in 5, or 6, or 7 minutes, and then we will have time to have questions for all of you. Needless to say, your entire testimony will be printed in the record at the point in which you are recognized.

Let's start out with Mr. Nosenchuck.

STATEMENTS OF NORMAN H. NOSENCHUCK, PRESIDENT, ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE MANAGEMENT OFFICIALS, AND DIRECTOR, DIVISION OF SOLID WASTE, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION; KENT STODDARD, PROJECT MANAGER, TOXIC WASTE ASSESSMENT GROUP, GOVERNOR'S OFFICE OF APPROPRIATE TECHNOLOGY, STATE OF CALIFORNIA; MELVIN GOLDBERG, ESQ., NEW YORK PUBLIC INTEREST RESEARCH CENTER; AND LINDA GREER, SCIENCE ASSOCIATE, TOXIC CHEMICALS PROGRAM, ENVIRONMENTAL DEFENSE FUND

Mr. NOSENCHUCK. Thank you, Mr. Chairman and members of the subcommittee. I appreciate this opportunity to testify on behalf of the New York State Department of Environmental Conservation. I request that my statement and its attachments be accepted into the record of this hearing.

I am now, Mr. Chairman, the past president of the Association of State and Territorial Solid Waste Management Officials. I am Norman H. Nosenchuck, director of the division of solid waste of the New York State Department of Environmental Conservation. I have been the director of the DEC division of solid waste since 1979 and am responsible for the hazardous and nonhazardous solid waste regulatory program in New York State, including Superfund-related activities for the cleanup of hazardous waste dump sites.

The New York State Department of Environmental Conservation supports the U.S. Environmental Protection Agency's efforts to promulgate stringent regulations covering land disposal facilities for hazardous wastes. The permitting requirements for land disposal facilities which were published in the July 26, 1982, Federal Register have, as their foundation, the fundamental goal and strategy for control of hazardous waste land disposal facilities which have guided New York State during the last 6 years. EPA's permitting requirements for land disposal facilities for hazardous waste management systems, scheduled to become effective on January 26, 1983, are a good beginning—but do not go far enough.

We in New York State consider EPA's land disposal regulations for hazardous waste facilities as minumum national requirements.

New York will go beyond these minimum land disposal regulations to protect the public health of our citizens and our environment.

The New York Department of Environmental Conservation's policy is to minimize the volumes and types of hazardous waste being disposed of on the land. Secure land burial or land filling is not an appropriate technology for many wastes and is not the optimum technology for the disposal of others. Secure land burial facilities must be monitored and maintained for long periods of time to prevent environmental releases. Additionally, an irretrievable commitment of land resources results when hazardous waste is buried. Certain hazardous wastes can be acutely toxic, are suspected or known human carcinogens, and are persistent and highly mobile in the environment. The accidental release of these wastes from a disposal facility could create a long-term threat to human health and the natural resources of the State. Surface water and ground water could be especially susceptible to pollution from land burial facilities.

The EPA land disposal regulations and current DEC regulations share a common goal, which is the minimization of migration of hazardous wastes into the environment. However, there are two major areas of concern with regard to EPA's land disposal regulations. First, we are concerned with the translation of performance standards into specific design, construction, and operating requirements by EPA in Washington and, subsequently, by the EPA regional administrators. We would like to be assured that there will be consistent and equitable interpretations of the performance standards into specific permit requirements.

Second, we remain unconvinced that EPA should provide exemptions from ground water monitoring and response requirements, and the liner and leachate collection and removal requirements for surface impoundments, waste piles, and landfills. New York State does not believe that a prediction of the fate of hazardous constituents migration from a land disposal facility and its future effect upon ground-water resources is a sensible replacement for requiring the positive control provided by definitive engineering design.

Our goal in New York is to provide protection from solid waste management facilities or sites that have a potential for serious or irreversible damage to the environment or that threaten public health. To help achieve our goal, we require onsite environmental monitors at such facilities or sites. These environmental monitors are required beyond our routine inspections and monitoring procedures.

We have certain criteria for determining which facilities require this additional monitoring, but, due to their significance, the following types of facilities always require environmental monitors: (a) Commercial secure land burial; (b) commercial hazardous waste process incinerators; and (c) commercial processing/treatment facilities which handle acutely toxic wastes as defined in State regulations.

Our department provides staff and equipment for monitoring, and each facility operator is required to fund the cost of the entire monitoring operation. EPA would be well advised to follow New York State's lead on this, since commercial secure land burial facilities have the potential to cause serious damage to the environment or endanger human health. EPA should require onsite environmental monitors to be full-time inspectors at hazardous waste land disposal facilities. This should be in addition to routine inspections and monitoring provided by Federal or State regulatory agencies. EPA should require facility or site owners to provide to the appropriate State regulatory agency the necessary funds to cover the expenses of these environmental monitors.

The hazardous waste management program, at the National and at State levels, is still in its infancy. This is not a mature program like the water and air pollution control programs. EPA has finally promulgated the major RCRA subtitle C regulations; however, State programs are still being established. The Federal hazardous waste management program must be implemented by the States if the program is ever going to function properly. There is not enough manpower currently available to carry out mandated State and Federal responsibilities in the hazardous waste management program area.

Adequate management and enforcement of the RCRA hazardous waste management program has not been achieved and cannot be accomplished under the current Federal strategy of thrusting more and more responsibility onto the States while concurrently decreasing Federal financial support to the States for RCRA-required activities.

It is true, of course, that this year under section 3011 of RCRA, programs grants to the States were increased about 5.7 percent to $44 million for the current Federal fiscal year from the $41.7 million that was available last fiscal year. However, let us not forget that it was Congress that increased the program grants to the States. EPA wanted to cut program grants to the States by some 16 percent. Furthermore, EPA had planned to totally phase out program support to the States for hazardous waste management activities in the next 2 or 3 years.

Conceptually, the President's "New Federalism" program is a good idea. Returning more responsibility for program implementation to the States with a concurrent phaseout and elimination of the Federal role makes sense. Years of State experience and State resources could be effectively utilized to address unique State concerns and to implement hazardous waste management programs that reflect State priorities.

The reality of the "New Federalism," however, is another story. The States were not full partners with EPA in the development of the RCRA regulations that they are now being asked to implement. More dollars are needed, rather than fewer dollars, to take on the new State hazardous waste management responsibilities under subtitle C of the Resource Conservation and Recovery Act. Federal financial assistance continues to be the key to a State's ability to establish and maintain a viable State hazardous waste management program.

EPA continues to shy away from a major unanswered question related to implementation of the Federal hazardous waste management program: Do the States have the ability to adequately administer and enforce the Federal hazardous waste management program? EPA does not want to provide program support to the States beyond the next fiscal year or two. The States depend upon the

Congress, not EPA, to look out for the States interest in this matter. EPA's track record speaks for itself. New York State has not accepted phase I interim authorization of its hazardous waste management program because there is no commitment by the Federal Government to pay its share of the program costs. We do expect to seek full authorization for our program if adequate resources are made available. However, if the present condition of inadequate funding to carry out legislative and regulatory hazardous waste management mandates continues in New York State without increased program funding through State legislative enactment of a fee bill or increased State or Federal appropriations, I see the need to give the Federal Government the full burden of administering its hazardous waste management program in New York State. Other States have similar concerns.

Do the States who have received phase I and phase II interim authorization actually have the resources to do the work for which they are committed? Or did EPA close its eyes to get States into the fold so that EPA could report to the Congress that the States are clamoring to take over the Federal hazardous waste management program? The States do not have the necessary resources, and I suspect that serious questions will be raised in some of these States during the course of the phase II permit process.

Incidentally, how much hazardous waste is really out there that will be regulated under RCRA? How much hazardous waste is really produced in this country? I believe that the information that EPA is using is not accurate and, when the reports do come in, I think that all of us will be surprised by the amount of hazardous waste produced in the United States.

We should not delude ourselves. Adequate resources are needed for effective programs. We cannot do it with mirrors. RCRA is still in serious trouble.

[The prepared statement of Mr. Nosenchuck follows:]

TESTIMONY OF NORMAN H. NOSENCHUCK, P.E., DIRECTOR, DIVISION OF SOLID WASTE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AT
UNITED STATES HOUSE OF REPRESENTATIVES COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT
PUBLIC HEARING
ON
EPA'S INTERIM FINAL REGULATIONS FOR LAND DISPOSAL OF HAZARDOUS WASTES

DECEMBER 8, 1982

Thank you, Mr. Chairman and members of the Subcommittee; I appreciate this opportunity to testify on behalf of the New York State Department of Environmental Conservation. I request that this statement and its attachments be accepted into the record of this hearing.

I am Norman H. Nosenchuck, Director of the Division of Solid Waste of the New York State Department of Environmental Conservation (DEC). I have been the Director of the DEC Division of Solid Waste since 1979 and am responsible for the hazardous and non-hazardous solid waste regulatory program in New York State, including Superfund related activities for the cleanup of hazardous waste dumpsites.

The New York State Department of Environmental Conservation supports the United States Environmental Protection Agency's (EPA) efforts to promulgate stringent regulations (40 CFR Part 264) governing land disposal facilities for hazardous wastes. The permitting requirements for land disposal facilities published in the July 26, 1982 Federal Register have, as their foundation, the fundamental goal and strategy for control of hazardous waste land disposal facilities which have guided New York State during the last six years. EPA's permitting requirements for land disposal facilities for hazardous waste management systems, scheduled to become effective on January 26, 1983, are a good beginning--but do not go far enough.

We in New York State consider EPA's land disposal regulations for hazardous waste facilities as minimum national requirements. New York will go beyond these minimum land disposal regulations to protect the public health of our citizens and our environment.

The New York State Department of Environmental Conservation's policy is to minimize the volumes and types of hazardous wastes being disposed-of on the land. Secure landburial (land-filling) is not an appropriate technology for many wastes and is not the optimum technology for the disposal of others. Secure landburial facilities must be monitored and maintained for long periods of time to prevent environmental releases. Additionally, an irretrievable commitment of land resources results when hazardous waste is buried. Certain hazardous wastes can be acutely toxic, are suspected or known human carcinogens, and are persistent and highly mobile in the environment. The accidental release of these wastes from a disposal facility could create a long-term threat to human health and the natural resources of the state; surface water and groundwater could be especially susceptible to pollution from landburial facilities.

The EPA land disposal regulations and current DEC regulations share a common goal, which is the minimization of migration of hazardous wastes into the environment. However, there are two major areas of concern with regard to EPA's land disposal regulations. First, we are concerned with the translation of performance standards into specific design, construction and operating requirements by EPA, Washington, D.C., and subsequently by the EPA Regional Administrators. We would like to be assured that there will be consistent and equitable interpretations of the performance standards into specific permit requirements. Secondly, we remain unconvinced that EPA should provide exemptions from groundwater monitoring and response requirements (Subpart F of 40 CFR Part 264) and the liner and leachate collection and removal requirements for surface impoundments, waste piles and landfills (Subparts K, L and N). New York State does not believe that a prediction of the fate of hazardous constituents migration from a land disposal facility and its future effect upon groundwater resources is a sensible replacement for requiring the positive control provided by a definitive engineering design.

Our goal in New York is to provide protection from solid waste management facilities or sites that have a potential for serious or irreversible damage to the environment or that threaten public health. To help achieve our goal, we require On-Site Environmental Monitors at such facilities or sites. These environmental monitors are required beyond our routine inspections and monitoring procedures. We have certain criteria for determining which facilities require this additional monitoring--but, due to their significance, the following types of facilities always require environmental monitors:

(A) Commercial secure landburial;

(B) Commercial hazardous waste process incinerators; and,

(C) Commercial processing/treatment facilities which handle acutely toxic wastes as defined in State regulations.

Our Department provides staff and equipment for monitoring, and each facility operator is required to fund the cost of the entire monitoring operation. EPA would be well advised to follow New York State's lead on this, since commercial secure landburial facilities have the potential to cause serious damage to the environment or endanger human health. EPA should require On-Site Environmental Monitors to be full time inspectors at hazardous waste land disposal facilities. This should be in addition to routine inspections and monitoring provided by a federal or state regulatory agencies. EPA should require facility or site owners to provide to the appropriate state regulatory agency the necessary funds to cover the expenses of these environmental monitors.

The hazardous waste management program--at the national and at state levels--is still in its infancy. This is not a mature program like the water and air pollution control programs. EPA has finally promulgated the major RCRA Subtitle C regulations; however, state programs are still being established. The Federal hazardous waste management program must be implemented by the States if the program is ever going to function properly. There is not enough manpower currently available to carry out mandated State and Federal responsibilities in the hazardous waste management program area.

Adequate management and enforcement of the RCRA hazardous waste management program has not been achieved, and cannot be accomplished under the current Federal strategy of thrusting more and more responsibility onto the States, while concurrently decreasing Federal financial support to the States for RCRA-required activities.

It is true, of course, that this year under Section 3011 of RCRA, program grants to the States were increased about 5.7 percent to $44 million for the current Federal Fiscal Year from the $41.7 million that was available last fiscal year. However, let us not forget that it was Congress that increased the program grants to the States--EPA wanted to cut program grants to the states by some 16 percent. Furthermore, EPA had planned to totally phase out program support to the States for hazardous waste management activities in the next two or three years.

Conceptually, the President's "New Federalism" program is a good idea. Returning more responsibility for program implementation to the States with a concurrent phaseout and elimination of the federal role makes sense. Years of State experience and State resources could be effectively utilized to address unique State concerns and to implement hazardous waste management programs that reflect State priorities.

The reality of the "New Federalism", however, is another story. The States were not full partners with EPA in the development of the RCRA regulations that they are now being asked to implement. More dollars are needed, rather than fewer dollars, to take on the new State hazardous waste management responsibilities under Subtitle C of the Resource Conservation and Recovery Act. Federal financial assistance continues to be the key to a State's ability to establish and maintain a viable state hazardous waste management program.

EPA continues to shy away from a major unanswered question related to implementation of the federal hazardous waste management program: do the States have the ability to adequately administer and enforce the Federal hazardous waste management program? EPA does not want to provide program support to the States beyond the next fiscal year or two. The States depend upon the Congress--not EPA--to look out for the States' interest in this matter. EPA's track record speaks for itself. New York State has not accepted Phase I interim authorization of its hazardous waste management program, because there is no commitment by the Federal Government to pay its share of the program costs. We do expect to seek full authorization for our program if adequate resources are made available. However, if the present condition of inadequate funding to carry out legislative and regulatory hazardous waste management mandates continues in New York State, without increased program funding through State legislative enactment of a fee bill or increased state or federal appropriations, I see the need to give the Federal Government the full burden of administering its hazardous waste management program in New York State. Other states have similar concerns.

Do the states who have received Phase I and Phase II Interim Authorization actually have the resources to do the work for which they are committed? Or, did EPA close its eyes to get states into the fold, so that EPA could report to the Congress that the States are clamoring to take over the federal hazardous waste management program? The States do not have the necessary resources, and I suspect that serious questions will be raised in some of those states during the course of the Phase II permit process.

Incidentally--how much hazardous waste is really out there that will be regulated under RCRA? How much hazardous waste is really produced in this country? I believe that the information that EPA is using is not accurate and, when the reports do come in, I think that all of us will be surprised by the amount of hazardous waste produced in the United States.

We should not delude ourselves. Adequate resources are needed for effective programs. We cannot do it with mirrors. RCRA is still in serious trouble.

EXPANDED COMMENTS AND BACKGROUND MATERIAL SUBMITTED FOR THE RECORD BY
NORMAN H. NOSENCHUCK, P.E., DIRECTOR, DIVISION OF SOLID WASTE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AT UNITED STATES HOUSE OF REPRESENTATIVES COMMITTEE ON SCIENCE AND TECHNOLOGY,
SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT
PUBLIC HEARING ON EPA'S INTERIM FINAL REGULATIONS FOR LAND DISPOSAL OF HAZARDOUS WASTES

DECEMBER 8, 1982

New York State has had stringent regulations to control the land disposal of hazardous wastes since 1977, which include such design and operating requirements as impermeable liners, leachate collection systems, final cover, groundwater monitoring and contingency plans, and limitations on liquid waste disposal. In general EPA's land disposal regulations are based on a control philosophy which has been administered by New York State during the past several years utilizing state laws and regulations, policies and special permit conditions.

We agree with the fundamental goal of the EPA regulations which is to minimize the migration into the environment of the hazardous component of waste placed in land disposal units. This has been New York's goal and we endorse EPA's efforts in making this goal the basis of its nationwide regulations.

We also endorse EPA's strategy for achieving the fundamental goal which is (a) liquids management to minimize leachate generation and removing leachate before it enters the subsurface environment; and (b) groundwater monitoring and response program for existing and new land disposal facilities. Currently, New York State requires leachate containment and collection systems, and groundwater monitoring and contingency plans for all hazardous waste land disposal facilities.

During the last several years numerous groundwater contaminating land disposal sites in New York State have been discovered and investigated demonstrating the need for very stringent design and operation control. New York State's climatological conditions foster the generation of significant quantities of leachate, while our natural hydrogeological conditions make it relatively easy for migrating leachate to come in contact with the groundwater environment. These natural conditions in conjunction with inadequate design and operating standards of the past help create long-term groundwater pollution.

Due to past groundwater pollution caused by hazardous waste land disposal and the resultant social, environmental and economic damages, New York State considers land disposal of hazardous waste, even in secure cells, as the disposal method of last resort. We have been encouraging industry to minimize reliance upon land disposal; however, we realize that secure landfills are necessary and desirable interim solutions until practicable alternatives can be implemented. Briefly, I would like to list some of the program elements which the Department of Environmental Conservation currently employs to control landburial of hazardous wastes.

1. Since 1977, New York State's Solid Waste Management regulations (6 NYCRR Part 360) have contained stringent design and operating standards for secure landburial facilities. Each facility has unique characteristics which usually require the imposition of special construction and operation permit conditions whose purpose it is to prevent the migration of generated leachate into

groundwater during and following the active life of the facility.

2. New York State has limited the landburial of bulk and containerized liquid wastes. Landburial of liquids or other wastes materials containing free liquids and slurries have been strictly limited through the permit process. New York State does not allow the land disposal of hazardous bulk liquids. In the case of containerized liquid wastes, New York State requires that free liquid be minimized to the maximum extent feasible. In practice, liquids in containers are either decanted or inert material is added to eliminate residual free-standing liquid. In March 1982, the Commissioner of the New York State Department of Environmental Conservation, in an EPA hearing on disposal of liquids in landfills opposed removing the ban on the disposal of liquid hazardous waste. We strongly support the continuation of the ban on disposal of free-standing liquids which became effective on March 22, 1982 as an interim final amendment to 40 CFR Part 265.

3. In the case of commercial hazardous waste management facilities, the Department of Environmental Conservation is requiring the facility owner to submit a ten-year plan which must delineate the development and implementation of high technology alternatives such as incineration, neutralization, fixation or chemical detoxification, principally to minimize reliance upon secure landburial.

4. The Department of Environmental Conservation has required the establishment of State employed on-site environmental monitors at significant hazardous waste management facilities, especially those facilities which utilize land disposal. The owner or operator of the facility is required through special permit condition to provide necessary funding for salary and equipment so that the State can employ a person with sufficient technical skills to conduct daily observations of site activities. This helps to assure that the facility owner/operator is conducting business in accordance with State issued permits.

5. If additional funding is received, the Department of Environmental Conservation intends to develop regulations to ban the landfilling of certain wastes. Thus far, the State has been able to impose permit conditions that have limited the landburial of certain generic wastes such as highly flammable wastes, radioactive isotapes, explosives, shock sensitive or pyrophoric substances. Furthermore, we have required the segregation of incompatible wastes (i.e., subcells within a landfill with discrete leachate collection), and limitation of liquids in landfills. However, New York has not reached its objective since we believe that secure landburial is not the appropriate technology for many wastes and not the optimum technology for the disposal of other wastes.

The New York State Department of Environmental Conservation would support an effort by the U.S. Environmental Protection Agency to promulgate a ban on the land disposal of certain hazardous wastes. Generally, we believe that waste candidates for such a ban are those chemicals which (a) are environmentally persistent, (b) have high environmental mobility, particularly in a soil environment, (c) are proven human or animal carcinogens, (d) are very highly toxic to humans, plants and animals, or (e) possess highly hazardous physical properties, such as explosiveness or low flash points.

New York State is specifically concerned with two major areas of the land disposal regulations (40 CFR Part 264). These two major areas are with regard to (A) The translation of performance standards into specific design, construction and operating requirements by EPA; (B) The provision for exemptions from groundwater monitoring and response requirements and liner and leachate collection and removal requirements as presently proposed in the land disposal regulations.

(A) The performance standard concept. The land disposal regulations principally consist of "performance standards" which are defined in the preamble (FR, Page 32284) as engineering objectives which allow the permit applicant to develop a design or set of practices to achieve the objective. The regulation also speaks of the performance standards as "general common sense engineering goals leaving the details to be specified on a case-by-case basis in permits." There are few "design and operating standards" (i.e., specific engineering practices or material specifications such as minimum thickness of final cover) contained in the regulation. Although this is understandable due to the fact that the regulations must service the entire nation, it raises concern that there must be careful surveillance of the application of these regulations to assure that the EPA regions apply them consistently and equitably. These regulations must be tested before we will be able to judge their effectiveness in protecting the environment since the "performance standards" must be translated into specific "design and operating standards" for each permit application.

(B) Exemptions

(1) New York State believes that EPA should reconsider the provision in Subpart F which provides for an exemption from the groundwater monitoring and response requirements. It seems to us that providing an exemption for land disposal facilities is not consistent with the fundamental goal and strategies stated at the outset in the preamble (FR, Page 32284). Whereas the regulation seems to consider groundwater monitoring and response programs an essential backup to a liquids management strategy, an exemption from this backup system could be approved by the Regional Administrator if he found no "potential" for hazardous constituents to migrate from a regulated unit to an upper most aquifer. Since prevention of migration of waste constituents is the stated goal of the regulation, no exemption from groundwater monitoring and response should be allowed for an existing or new land disposal facility since monitoring is the only positive means, except for a double lined unit with a leak detection system, to verify that the design and operating standards contained in a permit for the waste management unit are effectively controlling the leachate that is generated during the active and post-closure period of the regulated unit.

(2) The EPA regulations should not provide for an exemption from the liner and leachate collection and removal requirements for surface impoundments, waste piles and landfills contained in Subparts K, L and N respectively. The liner and leachate collection and removal system is the keystone of a liquids management strategy; it can prevent contamination of soil and groundwater. New York State believes that the liner and leachate collection and removal system is the first and foremost line of defense against groundwater contamination. Although favorable hydrogeological conditions (e.g., thick impermeable clay soils) may be present, such conditions should be regarded only as factors which favor the location of a land disposal facility at a particular site. The natural favorable hydrogeological conditions should not be utilized as, nor should they substitute for the positive leachate control provided by an engineered land disposal design.

* *

The following written material relates to New York State's additional concerns with the RCRA hazardous waste management program. This written material covers the following items:

1. Small Quantity Generator Exemption — See page 5
2. Federal EPA Manifest System — See page 5
3. Annual Generator and TSD Facility Reports — See page 6
4. RCRA Exemptions for Characteristic Hazardous Wastes Destined for Beneficial Use, Reuse, Recycling or Reclamation — See page 7
5. Identification and Listing of Hazardous Wastes — See page 7
6. Mixtures of Listed Hazardous Wastes (40 CFR 261 Subpart D) — See page 8
7. Waste Oil — See page 8
8. Underground Storage Tanks — See page 9
9. Secondary Containment for Tank Facilities — See page 9
10. Polychlorinatedbiphenyls (PCB) As A Listed Hazardous Waste — See page 9
11. RCRA Regulation Development — See page 10
12. Self-Insurance Test for Financial and Liability Requirements — See page 10
13. Definitions of Surface Impoundment and Tank — See page 10
14. Regulation of Wastewater Treatment Units — See page 11
15. Expansion During Interim Status — See page 11

1. Small Quantity Generator Exemption

Current Federal Regulations in 40 CFR Part 261 provide an exemption from permit, performance standard, manifesting, reporting and all other requirements for small quantity generators. The State of New York is concerned with the thousands of Federally exempt facilities which generate less than 1,000 kg of non-acute hazardous waste per calendar month.

In 1982, New York State revised its solid waste management regulations by including more stringent requirements than Federal regulations for small quantity generators. Under current State regulations, generators who generate or store between 100 kg per month and 1,000 kg per month are not required to manifest their waste shipment; however, they must dispose of the waste at an authorized hazardous waste TSD facility and notify the facility of their exemption from manifesting requirements; they must package the wastes according to U.S. DOT specifications; and the waste containers must always be closed, except if necessary to remove or add wastes, and must be inspected at least quarterly for leaks or damages. In addition, generators of wastes between 100 and 1,000 kg per month must submit an annual report to New York State.

The current Federal small quantity generator exemption should be amended by reducing the exemption limit from 1,000 kg per month to 100 kg per month. The present Federal exemption creates significant potential adverse environmental impacts because thousands of small generators continue to dispose of hazardous wastes in landfills, such as municipal or private sanitary landfills, which have not been designed to prevent release of leachate, contaminated with hazardous constituents, to groundwater or surface waters. Also, it is usually the case that sanitary landfills lack operational controls appropriate for the safe handling of physically hazardous wastes (e.g., flammable, reactive or explosive wastes) which may endanger the public and landfill employees. The result of a more stringent small quantity generator exemption is that thousands of tons of hazardous wastes per year will be properly disposed of in an approved facility permitted to accept hazardous wastes, instead of in sanitary landfills. Also, by virtue of the fact that generators between 100 and 1,000 kg per month must submit annual reports, the State will be able to track such wastes to minimize the threat of illegal dumping and enable enforcement against violators.

The lengthy small generator study and delayed rule making procedure recently initiated by EPA is totally unacceptable from this State's perspective; the needs of the public and the environment are not best served. An accelerated timetable resulting in new regulations in one year or less must be developed and achieved.

2. Federal EPA Manifest System

The current Federal manifest system includes a four part document designating copies for the generator, transporter, the treatment, storage or disposal facility (TSD) and one form for the TSD to return to the generator. The flaw of this system is the lack of capability for State or Federal oversight or a watchdog role because the system relies fully on the integrity of a generator to report a discrepancy to the State or Federal authorities when the generator does not receive the confirming manifest form from the TSD facility. For example, with this system, the State or Federal government has no means of checking that proper transportation and delivery took place if a generator, fearing future liability, is reluctant to investigate the tampering or disappearance of a hazardous waste shipment and chooses to neglect to report any discrepancy to authorities. In effect, the present Federal manifest system would not permit enforcement of waste transportation violations because the government would not be able to detect such violations that are not reported by the waste generator either through an oversight or intentionally to avoid financial liability.

New York State adopted a more comprehensive system in its recent regulations. The New York State manifest system requires the generator to mail copies of the Part A manifest to both the generator State and disposer State, if different. Also, the TSD facility is required to mail copies of the Part B manifest to both states, confirming receipt of the shipment. By receipt of a copy of the manifest from both the generator and the receiving TSD facility, New York established a watchdog role for itself.

New York State recommends that the Federal government modify its manifest system to provide it with the capability to track the progress of hazardous waste transactions within a matter of days of their occurrence. The Federal Government would then be less reliant on the integrity of the generators, transporters and facilities participating in the system and will be able to independently identify suspect activities. If a shipment has been disposed of legally or if a problem in delivery has occurred in transit, the State as well as the Federal Government would be able to follow-up with the appropriate parties and take enforcement measures if necessary.

3. Annual Generator and TSD Facility Reports

If the USEPA proposed rule (Federal Register, Volume 47, #197, October 12, 1982) to replace the annual reporting requirements for generators and TSD facilities with a biannual survey of representative samples is made final, it will result in a different system than present New York State regulations mandate. Early in 1982, New York State revised existing solid waste management regulations to include the USEPA interim status standards, including the requirements for generator and TSD annual reports. In fact, New York required annual reports for generators who generate or store between 100 and 1,000 kilograms per month of non-acute hazardous waste.

New York does not intend to amend its regulations in order to conform with the EPA proposed rule for a biannual survey. New York State believes that it is necessary to have annual reports in order to determine where waste is being generated and what is done with it. For several years, only crude estimates of hazardous waste generation have been available. New York wants to accurately define any shortfall in treatment, storage and disposal capacity in order to develop a rational and practicable plan to manage hazardous waste generated in the State. The information available through the annual reports will enable New York to utilize real data versus estimates. New York State has been attempting to encourage the utilization of high technology in order to destroy or detoxify hazardous waste which now must be landburied. In order to recommend, promote or even mandate the utilization of higher technology, the type and quantity of hazardous wastes that are being generated must be known in order to establish a workable hazardous waste management plan for the State of New York.

Of immediate practical use, the annual reports will be monitored for violations and will assist New York in prioritizing TSD facilities for permitting activities, and generators, transporters and TSD facilities for inspection scheduling.

4. RCRA Exemptions for Characteristic Hazardous Wastes Destined for Beneficial Use, Reuse, Recycling or Reclamation

A. Manifest Exemption

Current Federal regulations exempt characteristic hazardous waste destined for beneficial reuse or recovery, other than sludges, from manifest requirements (40 CFR 261.6). In the case of waste destined for energy recovery, New York State believes that such an exemption provides an opportunity for unscrupulous generators and transporters to misrepresent the nature and actual intended fate of wastes in order to avoid regulatory requirements for environmentally safe treatment or disposal. Manifesting characteristic wastes destined for energy recovery provides assurance to the regulatory agency that the proper facility has received the waste. It also assists in identifying enforcement actions where wastes have been tampered with before or during transit.

B. Permit and Facility Standard Exemption

Facilities which utilize characteristic wastes other than sludges, for energy recovery purposes are totally exempt from RCRA regulation. Also, such facilities that utilize listed wastes and sludges must meet certain storage requirements, but the combustion unit is not required to comply with RCRA standards, other than the incinerator standards. These exemptions are unwise since it ignores potential air pollution impacts of burning waste fuels. Although New York provides an exemption from hazardous waste regulations for the management (i.e., treatment and storage) of characteristic waste which are beneficially used or reused, it requires that energy recovery facilities obtain a Permit to Construct and a Certificate to Operate an air contaminant source. At the present time, New York is also preparing regulations which make a distinction between virgin and waste fuels with the intention of specifying the allowable composition of waste constituents in fuel, combustion unit efficiency and air quality impacts.

5. Identification and Listing of Hazardous Wastes

The present EPA approach of listing substances as hazardous waste should be modified since it results in a substance being a regulated hazardous waste in one situation and a non-regulated waste in another, although physically and chemically identical substances; in other words, the source of the waste (i.e., how it is generated) is the primary mechanism used to list a waste rather than its toxic or hazardous properties.

The present listing of hazardous waste in 40 CFR Part 261, Subpart D should be expanded. Of special significance is the fact that wastes which may be hazardous to the environment and/or public health are not considered RCRA regulated listed hazardous wastes because they were not generated as "discarded commercial chemical products, off-specifications species, container residues, and residues thereof" (40 CFR 261.33). Since these substances are hazardous as "discarded commercial chemical products, etc.," they should also be regulated as a hazardous waste whenever they are generated by other means, such as the result of a manufacturing process.

In addition, the list of hazardous waste from non-specific and specific sources (40 CFR 261.31) appears to represent the larger and the more common industrial processes. Additional evaluation should be performed for less common industrial processes which generate hazardous wastes or sludges.

[illegible]s of Listed Hazardous Wastes (40 CFR 261 Subpart D)

Mixtures that contain one or more of the substances listed in 40 CFR Part 261, Subpart D, should be defined as hazardous wastes. For example, New York State is concerned that mixtures of substances listed in Section 261.33(e) or (f) are not designated as a regulated hazardous waste due to the fact that the mixture is not considered a "commercial chemical product or manufacturing chemical intermediate" because the mixture no longer consists of a pure or technical grade chemical formulation in which the chemical is the "sole active ingredient." Therefore, in this case, a mixture of substances listed in Section 261.33(e) or (f) could escape regulation as a hazardous waste, unless the waste mixture were generated from non-specific or specific sources (40 CFR 261.31 and 261.32) or failed a test for characteristic hazardous waste (Subpart C of 40 CFR Part 261). In addition, mixtures of materials listed in Sections 261.31 and 261.32 should be listed hazardous wastes.

7. Waste Oil

Under current Federal regulations, waste oil may or may not be a hazardous waste depending upon whether it passes or fails one of the characteristic tests, usually EP Toxicity for maximum lead concentration (40 CFR 261.24). However, if a particular waste oil is a characteristic hazardous waste, it still is not regulated under RCRA (no permit and no manifesting required) if it is beneficially used, reused or legitmately recycled or reclaimed per 40 CFR 261.6. In most cases, the concerns of New York State are with regard to the transportation and use of waste oil for purposes of energy recovery.

New York State did not follow the approach of EPA regarding the waste oil issue. When New York revised its solid waste management regulations in 1982 to incorporate interim status standards, it did provide permit-exempt status for facilities that burn waste oil for energy recovery. However, regulations do require such a facility to obtain air quality construction and operating permits. We also imposed controls over the transportation of waste oil by requiring registration of transporting vehicles and manifesting of hazardous waste oil generated in quantities greater than 1,000 kg per month. The State has found significant problems with waste oil shipping and handling, especially with foreign contaminating substances (e.g., listed hazardous wastes) being identified in the waste oil.

Since New York perceives that there is a high potential for abuse in the area of waste oil/waste fuel markets, it is recommended that the U.S. Environmental Protection Agency consider either (a) listing waste oil as a hazardous waste or (b) creating a separate category to control the distribution and disposal of waste oil because of its inherent hazardous characteristics. Waste oil is simply too difficult to control as a characteristic hazardous waste.

8. Underground Storage Tanks

The New York State Department of Environmental Conservation considers the storage or treatment of hazardous waste in underground tanks to be environmentally imprudent. Underground tanks either cannot be or will not be properly inspected to guarantee that leakage is not occurring. Also, the inspection or testing of underground tanks means that they must be taken out of service; possibly a costly inconvenience. Above ground tanks can be visually inspected externally and leaks timely discovered to prevent environmental or public health impacts.

The EPA should consider the following actions:

(a) An immediate prohibition of new underground tanks by rule promulgation;

(b) A gradual phase-out of all existing underground tanks should be required.

However, if EPA chooses to allow the permitting of underground tanks that can be entered for inspection, New York State recommends that such tanks be double-walled construction with an internal leak detection system.

9. Secondary Containment for Tank Facilities

Under current Federal regulations in 40 CFR 264 Subpart J, new or existing storage or treatment tanks are not required to have secondary containment systems. Evaluation of the tank shell strength and inspection are relied upon for preventing tank leakage. However, this approach is not a guarantee that failure cannot occur.

A containment system such as that required for containers in Subpart I of Part 264 is needed to protect surface and groundwater resources; it has been utilized for hazardous material storage for several years. If a containment system were required, the dependence upon evaluation of tank shell strength (i.e., wall thickness) could be de-emphasized.

10. Polychlorinatedbiphenyls (PCB) As A Listed Hazardous Waste

Current New York State regulations (6 NYCRR Part 366) designate PCB's as a listed hazardous waste. The USEPA does not include PCB's as a hazardous waste under RCRA regulations, but rather regulates them under the Toxics Substances Control Act. One reason why New York State initially included PCB's as a listed hazardous waste was because New York does not have a TSCA equivalent. However, the USEPA should consider adding PCB's to the list of hazardous wastes for the following reasons:

(a) Since PCB's are a hazardous material, they should be regulated as a hazardous solid waste consistent with all other such wastes; and

(b) PCB's should be subject to full tracking (i.e., manifest) from generation to ultimate disposal due to the environmental and public health impacts resulting from mismanagement.

11. RCRA Regulation Development

Since the inception of the Resource Conservation and Recovery Act of 1976, EPA has had extreme difficulty in developing hazardous waste management regulations in a timely manner. And although the bulk of permitting and facility standard regulations have been issued, much remains to be completed including finalizing interim rules and proposing numerous new provisions and amendments. The most recent regulatory agenda published in the Federal Register on October 28, 1982, lists several dozen RCRA regulatory revisions and amendments under consideration. Unless greater support is given to the timely issuance of regulations and amendments, New York State will be hampered in its efforts to develop a comprehensive regulatory program to permit and monitor hazardous waste generators, transporters and TSD facilities. Identified loopholes and problem areas must be addressed on an accelerated schedule.

12. Self-Insurance Test for Financial and Liability Requirements

The EPA regulations on financial requirements (i.e., closure and post-closure care) and liability requirements (i.e., bodily injury and property damage to third parties) in 40 CFR Parts 264 and 265 contain several options which can be selected by the owner or operator of a hazardous waste management facility to assure financial responsibility. One option provided by EPA is a financial test (i.e., self-insurance) which demonstrates the financial strength of a company. Although the financial test is rigorous, New York State is not convinced that self-insurance should be an acceptable financial guarantee. Even large corporations can falter. Also, a weakness in this approach is the self-monitoring aspect of the test which may not guarantee sufficient time for enforcement action by the regulatory agency in the event of failure to perform on the part of the company.

13. Definitions of Surface Impoundment and Tank

The definitions for surface impoundment and tank, contained in 40 CFR Part 260 Subpart B, need clarification so that the appropriate facility standards can be determined. Considerable confusion has occurred where a storage or treatment facility for hazardous wastes apparently could satisfy portions of both definitions. One example of this type of situation is the case of an uncovered waste management unit constructed of concrete, possibly lined with a synthetic material and placed in a manmade excavation. There has been difficulty in determining whether tank or surface impoundment facility standards should govern; that is, either Subparts J or K of 40 CFR Part 264, respectively.

The principal concern is whether an inground or underground tank should be regulated like a surface impoundment. New York State believes that groundwater monitoring, as required for surface impoundments, should be required for all inground tanks and underground tanks, if they are permitted (see item no. 8 above) in order to provide for leak detection and groundwater protection. Since groundwater monitoring is not required under the EPA tank standards (40 CFR Part 264 Subpart J), inground tanks should be either regulated as surface impoundments as per Subpart K of 40 CFR Part 264 or the tank standards in Subpart J should be amended to require groundwater monitoring for inground or underground tanks.

14. Regulation of Wastewater Treatment Units

Wastewater treatment units are exempt from facility standards as per 40 CFR Part 264 Subpart A. By virtue of the definition of wastewater treatment unit in 40 CFR Part 260 Subpart B, EPA has chosen not to regulate those facilities which discharge either directly to surface waters (i.e., permit sources) or discharge to publicly owned treatment works (POTW).

New York State modified the EPA definition of "wastewater treatment unit" in its solid waste regulations (6 NYCRR Part 360) such that facilities which discharge to publicly owned treatment works are regulated in New York State. New York State does provide an exemption for wastewater treatment units that have a point source discharge as in the EPA exemption.

It is New York State's opinion that EPA should control wastewater treatment units that discharge to POTW's because these facilities do not have the equivalent level of regulatory review and oversignt that is presently provided by the State and Federal Government for point source discharges to surface waters. The storage, treatment and handling of hazardous wastes prior to their discharge to a POTW should be regulated.

15. Expansion During Interim Status

New York State is not in favor of allowing greater than 10 percent expansion of an interim status facility without requiring a permit and detailed technical review of construction and operation plans and specifications. New York State is opposed to allowing 50 percent expansion as is presently being considered by EPA. In fact, we recommend that the expansion allowance under interim status should be applicable only to facilities which treat or store in tanks or containers.

Mr. **Scheuer**. Thank you very much.

Now we will hear from Mr. Kent Stoddard, project manager of the Toxic Waste Assessment Group of the State of California.

Mr. **Stoddard**. Mr. Chairman, my name is Kent Stoddard. I direct the toxic waste assessment program for the office of appropriate technology, which is part of the California Governor's office.

I appreciate the opportunity to testify before you this morning about one of the most serious environmental and human health problems facing this country—that is, the land disposal of hazardous wastes.

Most of my testimony this morning will focus on California's recent program to phase out the land disposal of highly toxic wastes. I will describe the factors that led California to propose a phaseout on the land disposal of certain waste materials, describe how our ban actually works, and discuss how it can be applied nationally.

First, I want to point out that California's hazardous waste problems are not substantially different from those of most other industrialized States in this country. Our industries generate about 15 million tons of hazardous waste each year, about 25 percent of which are disposed of in landfills and surface impoundments. Although we can point to some very specific problems in California that have resulted from the land disposal of hazardous wastes—we are talking about pretty serious environmental contamination—our concern about land disposal runs much deeper than just the few problems that we have encountered in California.

Since discoveries at Love Canal in 1978, there has been a steadily growing body of evidence that land disposal is inadequate for the safe, long-term containment of hazardous wastes. Last year, I believe the EPA accurately summarized the consensus of opinion of the scientific community on the land disposal of hazardous wastes. In the February 5 Federal Register of last year, EPA stated:

> At the present time, it is not technologically and institutionally possible to contain wastes and constituents forever or for the long time periods that may be necessary to allow adequate degradation to be achieved. Consequently, the regulation of hazardous waste land disposal must proceed from the assumption that migration of hazardous wastes and their constituents and by-products from a land disposal facility will inevitably occur.

Today, as you look at the new landfill regulations being promulgated by EPA, it is obvious that they are rapidly retreating from their previous stance that we must assume all landfills will ultimately leak. Instead, EPA seems obsessed with designing the perfect landfill, despite overwhelming evidence that it is an impossible task.

Fortunately, EPA stands almost alone in their undying faith and commitment to land disposal. The adequacy of land disposal facilities for the protection of public health and environmental resources has been attacked by such diverse groups as the attorney general's office of the State of New York and the State of Illinois, the Kansas Engineering Society, the Princeton University, and Texas A&M. You have heard testimony from some of these organizations and universities already, and many others.

Certainly, the long-term security of a hazardous waste land disposal facility is dependent upon many, many factors. Not every landfill will become a Love Canal, and not every landfill will become a Stringfellow Quarry.

However, confronted with the huge body of evidence on the failure of land disposal sites, I don't believe there are more than a handful of scientists, if any, who would argue that the land disposal of hazardous wastes represents anything other than the method of last resort for most highly toxic and persistent waste materials.

Last year, California completed one of the most comprehensive studies ever attempted by any State to try to determine just how much of our hazardous wastes could be redirected from land disposal facilities. We prepared the first detailed characterization of the type and volume of wastes that are produced throughout the State; we identified those types of wastes which we felt represented the greatest risk to human health and to the environment when deposited in a landfill; and we research over 100 alternative waste management technologies that could safely be used to recycle, treat and incinerate hazardous wastes. The product of that effort was a report entitled "Alternatives to the Land Disposal of Hazardous Wastes: An Assessment for California."

The conclusions of this study were startling to the Governor, to the legislature and, to some extent, our own office. We found that almost 40 percent of all the wastes placed in California landfills were highly toxic and very persistent. These were wastes which were capable of causing death, cancer, birth defects, other serious human illnesses, and wastes which did not degrade for very long periods of time. Clearly, these wastes were inappropriate for land disposal.

We also found it is technologically feasible to recycle, treat or destroy at least 75 percent of all the wastes that go into California land disposal facilities—that is technologically feasible using well-documented, proven technologies.

We found that the additional cost of recycling, treating, or incinerating highly toxic wastes would have a minimal effect on California industries and that the cost was justified given the substantial threat to human health and to the environment.

Finally, we found that most of the alternative waste management capacity that we would need in California to recycle, treat, and incinerate hazardous wastes could be developed in less than 2 years.

After a year of close scrutiny by the California Legislature and by California's chemical, petroleum, and electronics industries, we found that these major conclusions today are almost universally accepted.

Today, in California, the necessity of restricting certain hazardous wastes from land disposal because of their toxity, mobility, and persistence is supported by widely diverse interests and organizations hazardous waste generators, chemical waste processors, local health officers and public interest groups.

I have attached to my written testimony a list of over 30 agencies, organizations, and individual companies that support prohibitions on land disposal. The list includes notable examples like Dow Chemical, Western Oil & Gas Association, Chemical Waste Management, the National Solid Waste Management Association, California Conference of Local Health Officers, the California Medical Association and the League of Women Voters.

I have also attached a copy of assembly bill 1543, which was passed by the California Legislature and signed into law earlier this year. In this bill, the legislature found that the land disposal of many types of untreated hazardous wastes pose long-term threats to public health and to California's air and water quality. The legislature also declared that it is in the public interest to establish regulations and incentives which insure that generators of hazardous waste employ safe technologies for the recycling, treatment and destruction of these wastes.

Two weeks ago, the California Department of Health Services formally adopted regulations which ban the land disposal of five categories of hazardous wastes. Those categories are cyanides, toxic metals, strong acids, PCB's, and halogenated organic compounds. During the next few months, we intend to add additional provisions that would also ban the land disposal of all wastes defined by State statute and State regulation as being extremely hazardous.

The five categories of waste that we have banned from land disposal are simply those that represent the greatest risk to human health and to the environment. These are the wastes we are spending millions of Superfund dollars to clean up at dump sites all over the country. These are the wastes we should never have permitted to ever be disposed of in land disposal facilities.

There are several key aspects of our new regulatory program that I want to highlight today. The first is that our new regulations represent the joing effort of California's air, water, and health protection agencies. They are based on sound, good science. They are also based on good commonsense.

Second, the regulations ban only the land disposal of highly toxic wastes, not all hazardous wastes. We believe there are some waste materials which can be safely deposited in landfills.

Third, the regulations provide for a phaseout on the land disposal of highly toxic wastes over a 2-year period starting on June 1 of next year. The phaseout schedule is intended to provide just enough time to insure that alternative treatment and destruction capability is actually available. We have no intent of banning land disposal if there are no acceptable alternatives available.

Finally, I want to emphasize that California's regulations allow any person or company to petition for a variance from our land disposal restrictions. The burden of proof is simply shifted to the petitioner to document that their waste material will not present a potential public health hazard or a potential threat to domestic livestock, wildlife, or the environment when placed in a land disposal facility.

I would like to submit a copy of California's regulations with supporting information documenting their necessity, their reasonableness, and their economic feasibility as part of the record for today.

Can the California program be applied nationally? I think the answer is an unequivocal yes. A decade ago, California provided the country with a model framework for the management of hazardous wastes. We were the first State to pass a hazardous waste control law, 4 years before RCRA. We were the first State to establish a manifest system to track hazardous wastes from the generator to the hauler to the disposal site.

Today, our hazardous waste program is substantially more stringent than that of the EPA's. There are more wastes defined by the State as hazardous than EPA defines. There are many loopholes that exist in Federal law that do not exist in California.

I believe that, once again, California can provide a national model for the safe management of hazardous wastes. Our experience during the last 14 months has shown that the transition from land disposal facilities to safer methods of treatment, recycling, and incineration can be achieved much more easily than we ever imagined.

It was just over a year ago that Governor Brown signed an executive order declaring that it was the policy of the State of California to reduce our dependence on chemical landfills and to encourage construction of safer alternative technologies.

Within 1 short year, the State has permitted five new treatment and incineration projects. We know of at least 10 other projects, high-technology projects, that are apparently in various stages of planning and development. And today, the operator of California's largest landfill has completely designed a facility that will treat 80 percent of all the wastes that now go to our largest landfill in southern California.

The use of alternative waste management technologies represents the safest and most expedient method of dealing with our Nation's hazardous waste problem, a problem that has already reached crisis proportions.

We know of many proven, well-documented technologies that will safely recycle, treat and destroy hazardous wastes. They are being used throughout Western Europe and they are being constructed right now in California.

But it must be understood that these technologies cannot compete with cheap landfills and that their use will be severely limited if EPA continues on its current course. It is critical that Congress and the EPA move this country away from its continued dependence on land disposal. We can start by acknowledging that land disposal is an unacceptable method of handling many waste materials and by acknowledging that, while land disposal is cheaper in the short term, it will always be a false economy over the long term.

During the last few years, California's hazardous waste program has been supported by a commitment from the Governor and the legislature to find solutions which will afford the highest level of protection to public health and to the environment.

In the absence of a similar commitment from the Reagan administration, it is incumbent upon Congress to provide greater legislative direction to the EPA. We hope that this will be the result of this hearing and that EPA will soon be directed to develop regulations to phase out the land disposal of highly toxic wastes throughout the entire country.

Very briefly, in summary, we cannot continue to allow our Nation's land disposal facilities to be repositories for known and suspected carcinogens, mutagens, teratogens and other highly toxic waste materials. The consequences are politically, economically, and environmentally unacceptable. The Nation desperately needs an aggressive but reasonable strategy to phase out the land disposal of highly toxic wastes and to encourage safer alternatives. I believe California has such a strategy, and we would like to work with the EPA to make that a national strategy.

Thank you.

[The prepared statement of Mr. Stoddard with attachments follow:]

TESTIMONY OF S. KENT STODDARD
DIRECTOR, TOXIC WASTE ASSESSMENT GROUP
GOVERNOR'S OFFICE OF APPROPRIATE TECHNOLOGY
STATE OF CALIFORNIA

PRESENTED TO THE
SUBCOMMITTEE ON NATURAL RESOURCES AGRICULTURE
RESEARCH & ENVIRONMENT
OF THE
COMMITTEE ON SCIENCE & TECHNOLOGY
UNITED STATE HOUSE OF REPRESENTATIVES

DECEMBER 8, 1982

MR. CHAIRMAN, MEMBERS OF THE COMMITTEE, MY NAME IS KENT STODDARD. I DIRECT THE TOXIC WASTE ASSESSMENT PROGRAM FOR THE OFFICE OF APPROPRIATE TECHNOLOGY, A PART OF THE CALIFORNIA GOVERNOR'S OFFICE.

I APPRECIATE THE OPPORTUNITY TO TESTIFY BEFORE YOU TODAY ABOUT ONE OF THE MOST SERIOUS ENVIRONMENTAL AND PUBLIC HEALTH PROBLEMS FACING THE NATION-- THE LAND DISPOSAL OF HAZARDOUS WASTES.

MOST OF MY TESTIMONY THIS MORNING WILL FOCUS ON CALIFORNIA'S RECENT EFFORT TO PHASE-OUT THE LAND DISPOSAL OF HIGHLY TOXIC WASTES. I WILL DESCRIBE THE FACTORS THAT LED US TO PROPOSE OUR LANDFILL BAN; DESCRIBE HOW THE BAN WORKS, AND DISCUSS HOW IT CAN BE APPLIED THROUGHOUT THE COUNTRY.

WHAT LED CALIFORNIA TO THEIR RESTRICTIONS ON LAND DISPOSAL?

CALIFORNIA'S HAZARDOUS WASTE PROBLEMS ARE NOT SIGNIFICANTLY DIFFERENT FROM THOSE OF MOST LARGE, INDUSTRIALIZED STATES. OUR INDUSTRIES GENERATE ABOUT 15 MILLION TONS OF HAZARDOUS WASTES EACH YEAR, ABOUT 25% OF WHICH ARE PLACED IN LAND DISPOSAL FACILITIES AND SURFACE IMPOUNDMENTS. ALTHOUGH WE CAN POINT TO SPECIFIC DOCUMENTED CASES IN WHICH A LAND DISPOSAL FACILITY IN CALIFORNIA WAS RESPONSIBLE FOR RATHER SERIOUS ENVIRONMENTAL CONTAMINATION, OUR CONCERN ABOUT THE LONG-TERM SECURITY OF LAND DISPOSAL FACILITIES IS MUCH DEEPER THAN A FEW CALIFORNIA-SPECIFIC PROBLEMS.

SINCE DISCOVERIES AT LOVE CANAL IN 1978, THERE HAS BEEN A STEADILY GROWING BODY OF EVIDENCE THROUGHOUT THE COUNTRY THAT LAND DISPOSAL IS INADEQUATE FOR THE SAFE, LONG-TERM CONTAINMENT OF HAZARDOUS WASTES. LAST YEAR, I BELIEVE THE EPA ACCURATELY SUMMARIZED THE CONSENSUS OF OPINION AMONG

THE SCIENTIFIC COMMUNITY ON THE LAND DISPOSAL OF HAZARDOUS WASTES. IN THE FEBRURARY 5 FEDERAL REGISTER EPA STATED:

> "AT THE PRESENT TIME, IT IS NOT TECHNOLOGICALLY AND INSTITUTIONALLY POSSIBLE TO CONTAIN WASTES AND CONSTITUENTS FOREVER OR FOR THE LONG TIME PERIODS THAT MAY BE NECESSARY TO ALLOW ADEQUATE DEGRADATION TO BE ACHIEVED. CONSEQUENTLY, THE REGULATION OF HAZARDOUS WASTE LAND DISPOSAL MUST PROCEED FROM THE ASSUMPTION THAT MIGRATION OF HAZARDOUS WASTES AND THEIR CONSTITUENTS AND BY-PRODUCTS FROM A LAND DISPOSAL FACILITY WILL INEVITABLY OCCUR." (FEDERAL REGISTER, VOL. 46 #24, FEB. 5, 1981)

TODAY IT IS OBVIOUS THAT THE EPA IS RAPIDLY RETREATING FROM THEIR PREVIOUS STANCE THAT WE MUST ASSUME ALL LANDFILLS WILL ULTIMATELY LEAK. INSTEAD, EPA SEEMS OBSESSED WITH DESIGNING THE PERFECT LANDFILL DESPITE OVERWHELMING EVIDENCE THAT IT IS AN IMPOSSIBLE TASK.

FORTUNATELY, EPA STANDS ALONE IN THEIR UNDYING FAITH AND COMMITMENT TO THE LAND DISPOSAL OF HAZARDOUS WASTES. THE ADEQUACY OF LAND DISPOSAL FACILITIES FOR THE PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT HAS BEEN ATTACKED BY SUCH DIVERSE GROUPS AS THE ATTORNEY GENERAL'S OFFICE OF THE STATE OF NEW YORK AND THE STATE OF ILLINOIS, THE KANSAS ENGINEERING SOCIETY, THE PRINCETON UNIVERSITY DEPARTMENT OF CHEMICAL ENGINEERING, AND THE TEXAS A&M UNIVERSITY DEPARTMENT OF SOIL SCIENCES.

- A RECENT STUDY DONE AT PRINCETON UNIVERSITY HAS SHOWN THAT FOUR NEW LANDFILLS IN NEW JERSEY THAT EXCEEDED FEDERAL DESIGN STANDARDS ARE LEAKING ORGANIC WASTES AFTER ONLY ONE-TWO YEARS OF OPERATION.

- RESEARCH DONE AT TEXAS A&M UNIVERSITY HAS SHOWN THAT CERTAIN ORGANIC COMPOUNDS LEAK THROUGH CLAY LINERS 1000 TIMES FASTER THAN DESIGNERS ANTICIPATED BASED ON PREVIOUS TESTS WITH WATER.

- THE 1400-MEMBER KANSAS PROFESSIONAL ENGINEERING SOCIETY HAS OFFICIALLY TAKEN THE POSITION THAT ALL LAND DISPOSAL OF HAZARDOUS WASTES SHOULD BE PROHIBITED.

- SEVERAL STATES, INCLUDING ILLINOIS, ARKANSAS, MASSACHUSETTS, MISSOURI, AND KENTUCKY HAVE ENACTED LEGISLATION WHICH WOULD PROHIBIT LAND DISPOSAL AND REQUIRE THE USE OF ALTERNATIVE WASTE MANAGEMENT TECHNOLOGIES.

THE LONG-TERM SECURITY OF A HAZARDOUS WASTE LANDFILL IS DEPENDENT UPON MANY FACTORS. EVERY LANDFILL WILL NOT BECOME A LOVE CANAL OR STRINGFELLOW QUARRY.

HOWEVER, CONFRONTED WITH THE HUGE BODY OF EVIDENCE ON THE FAILURE OF LAND DISPOSAL SITES, I DON'T BELIEVE THERE ARE MORE THAN A HANDFUL OF SCIENTISTS, IF ANY, WHO WOULD ATTEMPT TO ARGUE THAT LAND DISPOSAL IS ANYTHING OTHER THAN THE LAST RESORT FOR THE MANAGEMENT OF HIGHLY TOXIC AND PERSISTENT WASTES.

CALIFORNIA'S PROGRAM TO PHASE-OUT THE LAND DISPOSAL OF HIGHLY TOXIC WASTES

LAST YEAR CALIFORNIA COMPLETED ONE OF THE MOST COMPREHENSIVE STUDIES ATTEMPTED BY ANY STATE TO DETERMINE JUST HOW MUCH OF OUR WASTE STREAM COULD BE RE-DIRECTED FROM LAND DISPOSAL FACILITIES. WE PREPARED THE FIRST DETAILED CHARACTERIZATION OF THE TYPE AND QUANTITIES OF WASTE PRODUCED THROUGHOUT THE STATE; IDENTIFIED THE TYPE OF WASTES WHICH REPRESENT THE GREATEST RISK TO HUMAN HEALTH AND ENVIRONMENTAL RESOURCES WHEN PLACED IN THE LAND; AND RESEARCHED OVER ONE HUNDRED SEPARATE ALTERNATIVE WASTE MANAGEMENT TECHNOLOGIES. THE PRODUCT OF THIS EFFORT WAS A REPORT TITLED: ALTERNATIVES TO THE LAND DISPOSAL OF HAZARDOUS WASTES: AN ASSESSMENT FOR CALIFORNIA.

THE CONCLUSIONS OF THIS STUDY WERE STARTLING TO BOTH THE GOVERNOR AND LEGISLATURE. WE FOUND THAT:

1. ALMOST 40% OF ALL THE HAZARDOUS WASTES PLACED IN CALIFORNIA'S LAND DISPOSAL FACILITIES WERE HIGHLY TOXIC AND VERY PERSISTENT. THESE WASTES, WHICH ARE CAPABLE OF CAUSING DEATH AND SERIOUS HUMAN ILLNESS AND DO NOT DEGRADE FOR LONG PERIODS OF TIME, WERE UNQUESTIONABLY INAPPROPRIATE FOR LAND DISPOSAL.

2. IT IS TECHNOLOGICALLY FEASIBLE TO RECYCLE, TREAT, OR DESTROY AT LEAST 75% OF ALL THE HAZARDOUS WASTES WHICH WERE DISPOSED OF IN OUR CLASS I LANDFILLS.

3. THE ADDITIONAL COST OF RECYCLING, TREATING, OR INCINERATING HIGHLY TOXIC WASTES WOULD HAVE A MINIMAL EFFECT ON CALIFORNIA INDUSTRIES AND WAS JUSITIFIED GIVEN THE SERIOUS RISKS TO HUMAN HEALTH AND THE ENVIRONMENT.

4. MOST OF THE NEW ALTERNATIVE WASTE MANAGEMENT CAPACITY CALIFORNIA WOULD NEED TO RECYCLE, TREAT AND DESTROY ITS HAZARDOUS WASTES COULD BE DEVELOPED IN LESS THAN 2 YEARS.

AFTER A YEAR OF CLOSE SCRUTINY BY THE CALIFORNIA LEGISLATURE AND THE CHEMICAL, PETROLEUM, AND ELECTRONICS INDUSTRIES, THESE MAJOR CONCLUSIONS ARE ALMOST UNIVERSALLY ACCEPTED.

TODAY, IN CALIFORNIA, THE NECESSITY OF RESTRICTING CERTAIN HAZARDOUS WASTES FROM LAND DISPOSAL BECAUSE OF THEIR TOXICITY, MOBILITY, AND PERSISTENCE IS SUPPORTED BY WIDELY DIVERSE INTERESTS AND ORGANIZATIONS INCLUDING:

-- HAZARDOUS WASTE GENERATORS;
-- CHEMICAL WASTE PROCESSORS;
-- LOCAL HEALTH OFFICERS; AND
-- PUBLIC INTEREST GROUPS.

I HAVE ATTACHED TO MY WRITTEN TESTIMONY A LIST OF OVER 30 ORGANIZATIONS, COMPANIES, AND GOVERNMENT AGENCIES THAT ARE OFFICIALLY ON RECORD IN SUPPORT OF PROHIBITIONS ON LAND DISPOSAL. THIS LIST INCLUDES:

-- DOW CHEMICAL;
-- WESTERN OIL & GAS ASSOCIATION;
-- CHEMICAL WASTE MANAGEMENT;
-- NATIONAL SOLID WASTE MANAGEMENT ASSOCIATION;

-- CALIFORNIA CONFERENCE OF LOCAL HEALTH OFFICERS;
-- CALIFORNIA MEDICAL ASSOCIATION; AND THE
-- LEAGUE OF WOMAN VOTERS.

I HAVE ALSO ATTACHED A COPY OF ASSEMBLY BILL 1543 WHICH WAS PASSED BY THE CALIFORNIA LEGISLATURE AND SIGNED INTO LAW EARLIER THIS YEAR. IN AB 1543, THE CALIFORNIA LEGISLATURE FOUND THAT THE LANDFILL DISPOSAL OF MANY TYPES OF UNTREATED HAZARDOUS WASTES POSE LONG-TERM THREATS TO PUBLIC HEALTH AND AIR AND WATER QUALITY.

THE LEGISLATURE ALSO DECLARED THAT IT IS IN THE PUBLIC INTEREST TO ESTABLISH REGULATIONS AND INCENTIVES WHICH ENSURE THAT GENERATORS OF HAZARDOUS WASTE EMPLOY SAFE TECHNOLOGIES FOR THE RECYCLING, TREATMENT AND DESTRUCTION OF THESE WASTES.

CALIFORNIA'S REGULATIONS TO BAN THE LAND DISPOSAL OF HIGHLY TOXIC WASTES

TWO WEEKS AGO, THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES FORMALLY ADOPTED REGULATIONS WHICH BAN THE LAND DISPOSAL OF FIVE CATEGORIES OF HAZARDOUS WASTES. THOSE CATEGORIES ARE:

- CYANIDES
- TOXIC METALS
- STRONG ACIDS
- PCBs
- HALOGENATED ORGANIC COMPOUNDS

DURING THE NEXT FEW MONTHS WE INTEND TO ADD NEW PROVISIONS THAT WOULD ALSO BAN THE LAND DISPOSAL OF ALL WASTES DEFINED BY THE STATE AS "EXTREMELY HAZARDOUS."

THE FIVE CATEGORIES OF WASTE COVERED BY THE CALIFORNIA REGULATIONS ARE SIMPLY THOSE THAT REPRESENT THE GREATEST RISK TO HUMAN HEALTH AND ENVIRONMENTAL RESOURCES WHEN DEPOSITED IN A LAND DISPOSAL FACILITY. THESE ARE THE WASTES WE ARE SPENDING MILLIONS OF SUPERFUND DOLLARS TO CLEAN-UP AT DUMP SITES THROUGHOUT THE COUNTRY. THESE ARE WASTES WHICH WE NEVER SHOULD HAVE ALLOWED TO BE DEPOSITED IN THE LAND.

THERE ARE SEVERAL KEY ASPECTS OF CALIFORNIA'S NEW REGULATORY PROGRAM THAT DESERVE SPECIAL ATTENTION --

FIRST: THE REGULATIONS REPRESENT THE JOINT EFFORT OF CALIFORNIA'S AIR, WATER AND HEALTH PROTECTION AGENCIES. THEY ARE BASED ON SOUND SCIENTIFIC EVIDENCE AND MOST OF ALL GOOD COMMON SENSE.

SECOND: THE REGULATIONS BAN ONLY THE LAND DISPOSAL OF HIGHLY TOXIC WASTES -- NOT ALL HAZARDOUS WASTES. WE BELIEVE THERE ARE SOME WASTES WHICH CAN BE SAFELY DEPOSITED IN LANDFILLS.

THIRD: THE REGULATIONS PROVIDE FOR A PHASE-OUT ON THE LAND DISPOSAL OF HIGHLY TOXIC WASTES OVER A TWO-YEAR PERIOD STARTING ON JUNE 1 OF NEXT YEAR.

- JUNE 1, 1983 THE STATE WILL BAN CYANIDE WASTES;

- JANUARY 1, 1984 WE WILL BAN TOXIC METAL WASTES, STRONG ACIDS, AND PCBS;
- JANUARY 1, 1985 WE WILL BAN LIQUID WASTES CONTAINING HALOGENATED ORGANICS; AND FINALLY
- JULY 1, 1985 CALIFORNIA WILL BAN SLUDGES AND SOLIDS CONTAINING HALOGENATED ORGANIC COMPOUNDS AND ALL OTHER EXTREMELY HAZARDOUS WASTES.

THE PHASE-OUT SCHEDULE IS INTENDED TO PROVIDE JUST ENOUGH TIME TO ENSURE THAT ALTERNATIVE TREATMENT AND DESTRUCTION CAPACITY IS AVAILABLE BY THE TIME THE LAND DISPOSAL RESTRICTIONS TAKE EFFECT. WE HAVE NO DESIRE OR INTENT TO BAN LAND DISPOSAL IF THERE ARE NO ALTERNATIVES.

FINALLY: THE REGULATIONS ALLOW ANY PERSON OR COMPANY TO PETITION FOR A VARIANCE FROM THE LAND DISPOSAL RESTRICTIONS. THE BURDEN OF PROOF IS SIMPLY SHIFTED TO THE PETITIONER TO DOCUMENT THAT THEIR WASTE WILL NOT PRESENT A POTENTIAL HAZARD TO PUBLIC HEALTH, DOMESTIC LIVESTOCK, WILDLIFE, OR THE ENVIRONMENT WHEN PLACED IN A LAND DISPOSAL FACILITY.

I WOULD LIKE TO SUBMIT A COPY OF CALIFORNIA'S NEW LAND DISPOSAL RESTRICTION REGULATIONS FOR THE HEARING RECORD ALONG WITH SUPPORTING INFORMATION DOCUMENTING THEIR NECESSITY, REASONABLENESS, AND ECONOMIC FEASIBILITY.

CAN THE CALIFORNIA PROGRAM BE APPLIED NATIONALLY?

A DECADE AGO, CALIFORNIA PROVIDED THE COUNTRY WITH A MODEL FRAMEWORK FOR THE MANAGEMENT OF HAZARDOUS WASTES. WE WERE THE FIRST STATE TO PASS A HAZARDOUS WASTE CONTROL LAW AND THE FIRST STATE TO ESTABLISH A MANIFEST SYSTEM TO TRACK SHIPMENTS OF HAZARDOUS WASTES. CALIFORNIA'S PROGRAM PRECEEDED RCRA BY FOUR YEARS AND TODAY OUR PROGRAM IS SIGNIFICANTLY MORE STRINGENT THAN THAT OF EPA'S.

I BELIEVE THAT ONCE AGAIN CALIFORNIA CAN PROVIDE A MODEL FOR THE SAFE MANAGEMENT OF HAZARDOUS WASTES. OUR EXPERIENCE DURING THE LAST FOURTEEN MONTHS HAS SHOWN THAT THE TRANSITION FROM LAND DISPOSAL TO SAFER TREATMENT, RECYCLING, AND DESTRUCTION TECHNOLOGIES CAN BE MORE EASILY ACHIEVED THAN WE EVER IMAGINED.

IT WAS JUST OVER ONE YEAR AGO THAT GOVERNOR BROWN SIGNED AN EXECUTIVE ORDER DECLARING THAT IT WAS THE POLICY OF THE STATE OF CALIFORNIA TO:

-- REDUCE OUR DEPENDENCE ON CHEMICAL LANDFILLS FOR THE DISPOSAL OF UNTREATED TOXIC WASTES; AND TO

-- ENCOURAGE THE CONSTRUCTION OF NEW ADVANCED WASTE TREATMENT FACILITIES FOR THE RECYCLING, TREATMENT AND DESTRUCTION OF TOXIC WASTES.

WITHIN ONE SHORT YEAR THE STATE HAS PERMITTED FIVE NEW TREATMENT AND INCINERATION PROJECTS. WE KNOW OF AT LEAST 10 OTHER HIGH-TECHNOLOGY PROJECTS THAT ARE IN VARIOUS STAGES OF PLANNING AND DEVELOPMENT. AND THE

OPERATOR OF THE STATE'S LARGEST LANDFILL HAS DESIGNED A FACILITY THAT WILL TREAT ALMOST 80% OF ALL THE WASTES THAT NOW GO INTO THEIR CLASS I LAND DISPOSAL FACILITY.

CONCLUSION

THE USE OF ALTERNATIVE WASTE MANAGEMENT TECHNOLOGIES REPRESENTS THE SAFEST, AND MOST EXPEDIENT METHOD OF DEALING WITH OUR NATION'S HAZARDOUS WASTE PROBLEM -- A PROBLEM THAT HAS ALREADY REACHED CRISIS PROPORTIONS.

WE KNOW OF MANY PROVEN, WELL-DOCUMENTED TECHNOLOGIES THAT WILL SAFELY RECYCLE, TREAT AND DESTROY HAZARDOUS WASTES. THEY ARE BEING USED THROUGHOUT WESTERN EUROPE AND THEY ARE BEING CONSTRUCTED RIGHT NOW IN CALIFORNIA.

BUT IT MUST BE UNDERSTOOD THAT THESE TECHNOLOGIES OFTEN CANNOT COMPETE WITH CHEAP LANDFILLS AND THAT THEIR USE WILL BE SEVERELY LIMITED IF EPA CONTINUES ON ITS CURRENT COURSE. IT IS CRITICAL THAT CONGRESS AND THE EPA MOVE THIS COUNTRY AWAY FROM ITS CONTINUED DEPENDENCE ON LAND DISPOSAL. WE CAN START BY ACKNOWLEDGING THAT LAND DISPOSAL IS AN UNACCEPTABLE METHOD OF HANDLING MANY WASTE MATERIALS; AND BY ACKNOWLEDGING THAT WHILE LAND DISPOSAL IS CHEAPER IN THE SHORT-TERM, IT WILL ALWAYS BE A FALSE ECONOMY.

DURING THE LAST FEW YEARS CALIFORNIA'S HAZARDOUS WASTE PROGRAM HAS BEEN SUPPORTED BY A COMMITMENT FROM THE GOVERNOR AND THE LEGISLATURE TO FIND SOLUTIONS WHICH WILL AFFORD THE HIGHEST LEVEL OF PROTECTION TO PUBLIC HEALTH AND ENVIRONMENTAL RESOURCES.

IN THE ABSENCE OF A SIMILAR COMMITMENT FROM THE REAGAN ADMINISTRATION IT IS INCUMBENT UPON CONGRESS TO PROVIDE GREATER LEGISLATIVE DIRECTION TO THE EPA. WE HOPE THAT THIS WILL BE THE RESULT OF THIS HEARING AND THAT EPA WILL SOON BE DIRECTED TO DEVELOP REGULATIONS TO PHASE-OUT THE LAND DISPOSAL OF HIGHLY TOXIC WASTES THROUGHOUT THE ENTIRE COUNTRY.

SUPPORT FOR RESTRICTING THE LAND DISPOSAL OF HAZARDOUS WASTES

WESTERN OIL & GAS ASSOCIATION
DOW CHEMICAL COMPANY
AFL/CIO
CHEMICAL WASTE MANAGEMENT
3M CORPORATION
HAZARDOUS WASTE TREATMENT COUNCIL
BKK CORPORATION
NATIONAL SOLID WASTE MANAGEMENT ASSOCIATION
U.S. EPA
CALIFORNIA AIR RESOURCES BOARD
CALIFORNIA WATER RESOURCES CONTROL BOARD
CALIFORNIA CONFERENCE OF LOCAL HEALTH OFFICERS
LOS ANGELES CITY ATTORNEY'S OFFICE
ASSOCIATION OF BAY AREA GOVERNMENTS
CALIFORNIA MEDICAL ASSOCIATION
ENVIRONMENTAL DEFENSE FUND
NATURAL RESOURCES DEFENSE COUNCIL
CITIZENS FOR A BETTER ENVIRONMENT
FRIENDS OF THE EARTH
LEAGUE OF WOMEN VOTERS
ENVIRONMENTAL HEALTH COALITION
CONCERNED NEIGHBORS IN ACTION
CITY OF WEST COVINA
LOS ANGELES COUNTY DEPARTMENT OF HEALTH SERVICES
TEXAS A&M UNIVERSITY
CITY OF SIMI VALLEY
SACRAMENTO COUNTY HEALTH DEPARTMENT
ENVIRONMENTAL ACTION FOUNDATION
ENV, INC.
ENVIRITE WASTE TREATMENT SERVICE
BENDIX ENVIRONMENTAL RESEARCH
CITIZEN'S CLEARINGHOUSE FOR HAZARDOUS WASTES, INC.
SIERRA CLUB
CALIFORNIA STATE GRANGE

Assembly Bill No. 1543

CHAPTER 89

An act to amend Sections 25117, 25142, 25145, 25150, 25151, 25152, 25154, 25170, 25175, 25177, 25180, 25189, 25191, and 25202, and the heading of Article 7 (commencing with Section 25170) of Chapter 6.5 of Division 20 of, to amend and renumber Section 25172 of, to add Sections 25117.8, 25150.5, 25157, 25174.5, and 25178, and Article 5.5 (commencing with Section 25159) to Chapter 6.5 of Division 20 of, and to add and repeal Article 9.5 (commencing with Section 25206) to Chapter 6.5 of Division 20 of, and to repeal and add Sections 25100, 25101, and 25171 of, the Health and Safety Code, relating to hazardous waste, making an appropriation therefor, and declaring the urgency thereof, to take effect immediately.

[Approved by Governor March 2, 1982. Filed with Secretary of State March 2, 1982.]

LEGISLATIVE COUNSEL'S DIGEST

AB 1543, Tanner. Hazardous waste.

(1) Existing law does not provide for a Hazardous Waste Management Council.

This bill would create a Hazardous Waste Management Council consisting of specified members. The council would have the responsibility of preparing a Hazardous Waste Management Plan prior to January 1, 1983, containing, among other things, a statewide hazardous waste facilities siting and permit process and recommendations relating to legislative, administrative, and economic mechanisms necessary to assist in the siting of new hazardous waste facilities. The State Department of Health Services would be required to make specified information available to the council. The council would be required to hold public hearings on the draft and submit a final plan to the Governor and the Legislature prior to July 1, 1983.

(2) Existing provisions of the federal Resource Conservation and Recovery Act of 1976 permit any state to administer and enforce a state hazardous waste program in lieu of the federal program. The state must develop and submit an application to the Administrator of the Environmental Protection Agency and is authorized to conduct the state program unless the administrator finds that the state program is not equivalent to the federal program, not consistent with the federal or state programs applicable in other states, or that it does not provide adequate enforcement of compliance with the requirements of the federal hazardous waste management program. Existing provisions of the federal act also permit a state to seek, under specified circumstances, an interim authorization from the administrator to conduct such a program.

Existing law contains legislative findings and declarations relating to the handling, storage, use, processing, and disposal of hazardous waste.

This bill would revise those findings and declarations and in so doing, would, among other things, make a legislative declaration that it is in the best interest of the state to obtain and maintain federal authorization to administer a state hazardous waste program and would generally grant authority to the State Director of Health Services to secure and maintain interim and final authorization for the state hazardous waste program from the administrator. The bill would authorize the department to make available to the Environmental Protection Agency all information required by law, including trade secrets, in order to obtain and maintain interim and final authorization to administer the state hazardous waste program. The bill would, however, require the department to adopt and revise when necessary regulations which would allow the state to receive and maintain authorization to administer a state hazardous waste program in lieu of the federal program, as specified.

(3) The existing hazardous waste control law specifies that those provisions shall not be construed to limit or abridge the power and duties granted to the State Water Resources Control Board or regional water quality control boards. This bill would, in addition, specify that the provisions contained in the hazardous waste control law shall not be deemed to supersede the powers and duties granted to those boards.

Existing law requires the department to adopt minimum standards and regulations relating to hazardous waste.

This bill would delete the word "minimum" from those provisions of law and would require the department to adopt any standard or regulation required to be adopted by the hazardous waste control law, and revise any standard or regulation required to be revised by this act, on or before January 1, 1983.

(4) Existing law imposes a civil penalty, in an amount not to exceed $5,000, against any person who intentionally or negligently violates any provision of the hazardous waste control law, except that a civil penalty, in an amount not to exceed $25,000, is imposed against any person who intentionally or negligently disposes of hazardous waste at an unauthorized point.

This bill would increase the civil penalty for violating any provision of the hazardous waste control law to an amount not to exceed $25,000, except for certain prescribed violations in which the amount of the penalty shall not exceed $50,000.

(5) Existing law also imposes criminal fines and imprisonment for certain acts done knowingly by any person.

This bill would include within such provision the knowing destruction, alteration, or concealment of any record required to be maintained pursuant to the hazardous waste control law relating to the generation, storage, treatment, transportation, disposal, or handling of hazardous wastes.

The bill would specify that the provisions described in this paragraph and paragraph (4) shall not become operative if AB 70 is chaptered.

(6) Existing law requires each operator of any site at which hazardous wastes are disposed to pay a fee to the director pursuant to a schedule of fees established by the director.

This bill would require that the fees established by the director be determined according to specified criteria.

(7) The bill would also, among other things, require the department to prepare and submit to the Legislature a report every 2 years to include, among other things, information regarding the status of various programs, enforcement actions, and research activity, and to prepare and issue to the public a report every 2 years containing technological information relating to the treatment, storage, recycling, source reduction, and disposal of hazardous waste.

(8) Existing law requires penalties recovered pursuant to specified enforcement provisions to be deposited in the continuously appropriated Hazardous Waste Control Account in the General Fund, which funds may be expended by the department for the purposes of administering specified hazardous waste control statutes. This bill would increase the amount of certain penalties that may be imposed and, therefore, the bill would make an appropriation.

(9) Article XIII B of the California Constitution and Sections 2231 and 2234 of the Revenue and Taxation Code require the state to reimburse local agencies and school districts for certain costs mandated by the state. Other provisions require the Department of Finance to review statutes disclaiming these costs and provide, in certain cases, for making claims to the State Board of Control for reimbursement.

However, this bill would provide that no appropriation is made and no reimbursement is required by this act for a specified reason.

(10) The bill would take effect immediately as an urgency statute.

Appropriation: yes.

The people of the State of California do enact as follows:

SECTION 1. Section 25100 of the Health and Safety Code is repealed.

SEC. 2. Section 25100 is added to the Health and Safety Code, to read:

25100. The Legislature finds that:

(a) Increasing quantities of hazardous wastes are being generated in the state, for which the generators of the hazardous waste must provide safe disposal.

(b) Long-term threats to public health and to air and water quality are posed by the landfill disposal of many types of untreated hazardous wastes and by the inappropriate handling, storage, use, and disposal of hazardous wastes.

(c) Extensive technology exists for the safe treatment, neutralization, and destruction of many types of hazardous wastes prior to disposal.

(d) Numerous opportunities exist to reduce the amount of hazardous waste generated in the state and to conserve resources through the application of existing source reduction and recycling technology.

(e) The people of the state face immense costs as a result of improper hazardous waste handling and disposal practices.

SEC. 3. Section 25101 of the Health and Safety Code is repealed.

SEC. 4. Section 25101 is added to the Health and Safety Code, to read:

25101. The Legislature therefore declares that:

(a) In order to protect the public health and the environment and to conserve natural resources, it is in the public interest to establish regulations and incentives which ensure that the generators of hazardous waste employ technology and management practices for the safe handling, treatment, recycling, and destruction of their hazardous wastes prior to disposal.

(b) In order to assist the generators of hazardous waste in meeting the responsibility for the safe disposal of hazardous waste it is necessary to establish the Hazardous Waste Management Council.

(c) The Legislature further declares that in order to protect the public of this state and particularly the communities where hazardous wastes are treated and disposed, it is essential to assure full compensation of all people injured or damaged by hazardous wastes. It is therefore necessary that the Hazardous Waste Management Council, created pursuant to Section 25206, make recommendations regarding a system of insurance and mechanisms establishing liability to achieve this result, as required by subdivision (e) of Section 25208.

(d) It is in the best interest of the health and safety of the people of the State of California for the state to obtain and maintain authorization to administer a state hazardous waste program in lieu of the federal program pursuant to Section 3006 of Public Law 94-580, as amended, the Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6926). Therefore, it is the intent of the Legislature that the director shall have those powers necessary to secure and maintain interim and final authorization for the state hazardous waste program pursuant to the requirements of Section 3006 of Public Law 94-580, the Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6926), and to implement such program in lieu of the federal program.

SEC. 5. Section 25117 of the Health and Safety Code is amended to read:

25117. "Hazardous waste" means a waste, or combination of wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may either:

(a) Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.

(b) Pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

Unless expressly provided otherwise, the term "hazardous waste" shall be understood to also include extremely hazardous waste.

SEC. 6. Section 25117.8 is added to the Health and Safety Code, to read:

25117.8. "Natural resources" includes, but is not limited to, disposal site capacity and substances which are hazardous waste, or which are in hazardous waste, the reuse of which is technologically and economically feasible.

SEC. 7. Section 25142 of the Health and Safety Code is amended to read:

25142. Any waste which conforms to a criterion adopted pursuant to Section 25141 shall be handled, stored, used, processed, and disposed of in accordance with permits, orders, and regulations issued or promulgated by the department pursuant to this chapter and building standards published in the State Building Standards Code relating to hazardous waste facilities, or recycled consistent with the list of hazardous wastes which the department, pursuant to Section 25175, finds are economically and technologically feasible to recycle, until such waste is cited in a list adopted by the department pursuant to Section 25140.

SEC. 7.5. Section 25145 of the Health and Safety Code is amended to read:

25145. This chapter shall not be construed to limit, abridge, or supersede the powers or duties granted to the State Water Resources Control Board and each regional water quality control board by Division 7 (commencing with Section 13000) and Division 7.5 (commencing with Section 14000) of the Water Code.

SEC. 8. Section 25150 of the Health and Safety Code is amended to read:

25150. (a) Except as provided in Section 18930, the department shall adopt, and revise when appropriate, standards and regulations for the handling, processing, use, storage, and disposal of hazardous wastes to protect against hazards to the public health, to domestic livestock, to wildlife, or to the environment.

(b) The department shall apply the standards and regulations adopted pursuant to subdivision (a) to the use and operation of facilities for handling, treating, storing and disposing of hazardous waste and, except as provided in Section 18930, may adopt, and revise when appropriate, additional standards and regulations for the use and operation of such facilities to protect against hazards to public health, domestic livestock, wildlife, or the environment posed by such facilities.

(c) The department shall adopt, and revise when appropriate, regulations for the recycling of hazardous waste to protect against hazards to the public health, domestic livestock, wildlife, or to the environment and to encourage the best use of natural resources.

(d) The department shall adopt and submit building standards relating to hazardous waste facilities for approval pursuant to Chapter 4 (commencing with Section 18935) of Part 2.5 of Division 13 of this code for the purposes described in this section.

(e) Before preparation of such building standards or adoption of such other regulations, the department shall consult with all agencies of interested local governments, including, but not limited to, local governing bodies, local planning agencies, local health authorities, and local building inspection departments, and secure technical assistance from the Department of Food and Agriculture, the Department of the California Highway Patrol, the Department of Fish and Game, the Department of Industrial Relations, the Division of Industrial Safety, the State Air Resources Board, the State Water Resources Control Board, the State Fire Marshal, regional water quality control boards, the State Building Standards Commission, and the State Solid Waste Management Board.

SEC. 8.5. Section 25150.5 is added to the Health and Safety Code, to read:

25150.5. The department shall adopt all standards and regulations required to be adopted by any provision of this chapter, and shall revise any standard or regulation required to be revised by the act which enacted this section during the 1981 portion of the 1981–1982 Regular Session of the Legislature, on or before January 1, 1983.

SEC. 9. Section 25151 of the Health and Safety Code is amended to read:

25151. The department may adopt varying regulations pursuant to Section 25150, other than building standards for different areas of the state depending on population density, climate, geology, types and volumes of hazardous waste generated in the area, types of waste treatment technology available in the area, and other factors relevant to hazardous waste handling, processing, storing, recycling, and disposal.

SEC. 10. Section 25152 of the Health and Safety Code is amended to read:

25152. Before adopting building standards or adopting or revising other standards and regulations for the handling, processing, storing, use, recycling, and disposal of hazardous and extremely hazardous wastes, the department shall hold at least one public hearing in Sacramento, or in a city within the area of the state to be affected by the proposed regulations. Except as provided in Section 18930, the department shall adopt the proposed regulations after making changes or additions that are appropriate in view of the evidence and testimony presented at the public hearing or hearings.

SEC. 10.5. Section 25154 of the Health and Safety Code is amended to read:

25154. It shall be unlawful for any person to handle, store, use, process, or dispose of any hazardous waste or extremely hazardous waste except as provided for in this chapter or regulations adopted by the department pursuant to this chapter.

SEC. 11. Section 25157 is added to the Health and Safety Code, to read:

25157. Regulations adopted pursuant to this chapter may require the treatment of extremely hazardous waste at the site of production prior to any transportation, if the director determines that treatment is necessary to provide safe transportation of the extremely hazardous waste. No provision of this chapter shall be construed to require disposal of hazardous waste at the site of production, provided, that the transportation of the extremely hazardous waste conforms to all applicable regulations.

SEC. 12.5. Article 5.5 (commencing with Section 25159) is added to Chapter 6.5 of Division 20 of the Health and Safety Code, to read:

Article 5.5. Coordination with Federal Acts

25159. To the extent authorized by Section 25145, the department shall adopt and revise when necessary regulations which will allow the state to receive and maintain authorization to administer a state hazardous waste program in lieu of the federal program pursuant to Section 3006 of Public Law 94-580, as amended (42 U.S.C. 6926).

25159.5. In adopting or revising standards and regulations pursuant to this chapter, the department shall, insofar as practicable, make such standards and regulations conform with corresponding regulations adopted by the United States Environmental Protection Agency pursuant to Public Law 94-580, as amended (the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901 et seq.). Nothing in this section shall preclude the department from adopting standards and regulations which are more stringent or more extensive than federal regulations.

25159.6. Until such time as the department adopts standards and regulations corresponding to and equivalent to, or more stringent or extensive than, regulations adopted by the United States Environmental Protection Agency pursuant to Sections 3002, 3003, 3004, 3005 and 3006 of Public Law 94-580, as amended, the following shall apply:

(a) Any person who produces a waste which is a hazardous waste as defined by Section 25117 shall comply with this chapter and regulations adopted thereunder and, in addition, to the extent that the waste is both hazardous as defined by regulations adopted pursuant to Section 3001 of the Resource Conservation and Recovery Act, as amended (P.L. 94-580) and has not been excluded from regulation pursuant to that section, the person shall also comply with federal regulations adopted pursuant to Section 3002 of that federal act.

(b) Any person who transports a waste which is a hazardous waste as defined by Section 25117 shall comply with this chapter and regulations adopted thereunder and, in addition, to the extent that such waste is both hazardous as defined by regulations adopted pursuant to Section 3001 of the Resource Conservation and Recovery Act, as amended (P.L. 94-580), and has not been excluded from regulation pursuant to that section, the person shall also comply with federal regulations adopted pursuant to Section 3003 of that act.

(c) Any person who owns or operates a hazardous waste facility shall comply with this chapter and regulations adopted thereunder and, in addition, to the extent that the facility is defined as a hazardous waste facility in regulations adopted under the Resource Conservation and Recovery Act, as amended (P.L. 94-580), and to the extent that the waste is both hazardous as defined by regulations adopted pursuant to Section 3001 of that act and has not been excluded from regulation pursuant to that section, such person shall also comply with federal regulations adopted pursuant to Sections 3004 and 3005 of that act.

25159.7. Except as otherwise authorized, the Department of Health Services is authorized to carry out all hazardous waste management responsibilities imposed or authorized by Public Law 94-580, as amended, Public Law 96-510 (the Comprehensive Environmental Response, Compensation, and Liability Act of 1980), and subsequent amendments, and any regulations promulgated pursuant to these federal acts.

25159.8. Nothing in this chapter shall be construed as prohibiting the furnishing of trade secret information to the federal Environmental Protection Agency to the extent required by law to obtain and maintain interim and final authorization to implement the state hazardous waste program in lieu of the federal program under the Resource Conservation and Recovery Act of 1976, P.L. 94-580, as amended (42 USC 6901 et seq.). If the department has received a written claim that particular information furnished to the EPA is trade secret information, the department shall so inform the EPA.

25159.9. Notwithstanding any other provision of law, the department may make available to the federal Environmental Protection Agency any and all information required by law to be furnished to such agency pursuant to the Resource Conservation and Recovery Act of 1976, P.L. 94-580, as amended (42 USC 6901 et seq.) in order to obtain and maintain interim and final authorization to administer the state hazardous waste program in lieu of the federal program. The sharing of information between the department and the EPA pursuant to this section shall not constitute a waiver by the department or any affected person of any privilege or confidentiality of such information provided by law.

SEC. 13. The heading of Article 7 (commencing with Section 25170) of Chapter 6.5 of Division 20 of the Health and Safety Code is amended to read:

Article 7. Treatment, Recycling, and Disposal Technology

SEC. 13.5. Section 25170 of the Health and Safety Code is amended to read:

25170. The department in performing its duties under this chapter shall:

(a) Coordinate research and development regarding methods of hazardous waste handling, storage, use, processing, and disposal and may conduct appropriate studies relating to hazardous wastes.

(b) Maintain a technical reference center on hazardous waste disposal, recycling practices, and related information for public and private use.

(c) Provide statewide planning for hazardous waste facility site identification and assessment and render technical assistance to state and local agencies in the planning and operation of hazardous waste programs.

(d) Provide for appropriate surveillance of hazardous waste processing, use, handling, storage, and disposal practices in the state.

(e) Coordinate research and study in the technical and managerial aspects of management and use of hazardous wastes, and recycling and recovery of resources from hazardous wastes.

(f) Determine existing and expected rates of production of hazardous waste.

(g) Investigate market potential and feasibility of use of hazardous wastes and recovery of resources from hazardous wastes.

(h) Promote recycling and recovery of resources from hazardous wastes.

(i) Conduct studies for the purpose of improving departmental operations.

(j) Encourage the reduction or exchange, or both, of hazardous waste.

(k) Establish and maintain an information clearinghouse, which shall consist of a record of wastes which may be recyclable. Every producer of hazardous waste shall supply the department with information for the clearinghouse. Each producer shall not be required to supply any more information than is required by the manifests provided for in Section 25160. The department shall make this information available to persons who desire to recycle the wastes. The information shall be made available in such a way that the trade secrets of the producer are protected.

(*l*) Conduct pilot projects, as appropriate, to document the technical performance of emerging technologies which offer potential for ameliorating California's hazardous waste disposal problems.

SEC. 14. Section 25171 of the Health and Safety Code is repealed.

SEC. 15. Section 25171 is added to the Health and Safety Code, to read:

25171. Commencing July 1, 1982, and every other year thereafter, the department shall prepare and issue to the public a report that contains an assessment of the best available technologies for the treatment, storage, recycling, source reduction, and disposal of hazardous waste in preparation for revisions to regulations adopted pursuant to Section 25150. The assessment shall include, but not be limited to, those technologies considered by the department to be the best currently available and an estimate of the unit costs associated with each technology.

SEC. 16. Section 25172 of the Health and Safety Code is amended and renumbered to read:

25105. No provision of this chapter shall limit the authority of any state or local agency in the enforcement or administration of any provision of law which it is specifically permitted or required to enforce and administer.

SEC. 18. Section 25174.5 is added to the Health and Safety Code, to read:

25174.5. The schedule of fees established pursuant to Section 25174 shall provide that the fee paid for the disposal of a class of hazardous waste, as determined by the department, be increased or decreased relative to the fee applied to the disposal of other classes of hazardous wastes according to the relative short-term and long-term hazards posed by the hazardous waste at the point of disposal, as determined by the department, when compared to the other classes of hazardous wastes disposed of in California.

SEC. 21. Section 25175 of the Health and Safety Code is amended to read:

25175. (a) The department shall prepare and adopt and may revise when appropriate, a list of hazardous wastes which the department finds are economically and technologically feasible to recycle. Each substance shall be categorized according to the degree of difficulty and the kind of difficulty encountered in recycling that substance. Whenever any waste on the list is disposed of by a person, the department may request, and the producer or disposer of that waste shall supply the department with, a formal, complete, and detailed statement justifying why the waste was not recycled. If the request is made of any entity listed in Section 25118 other than an individual, the statement shall be issued by the responsible management of that entity. The department shall keep confidential any trade secrets contained in any such statement.

(b) If, after receipt of the statement described in subdivision (a), the department finds the recycling of a hazardous waste to be economically and technologically feasible at the site of production, as determined by the site operator, or, if the department provides the name of a ready, willing, and able purchaser of the recyclable waste, the disposer of the hazardous waste shall recycle the hazardous waste by either of the above described methods. Failure to comply with an order to recycle by either of these methods shall result in the assessment of fees for disposal pursuant to Section 25174. The director may establish fees for the disposal of hazardous wastes determined to be recyclable in amounts which may be up to two times the base fee paid under the annual fee schedule established by the director.

SEC. 22. Section 25177 of the Health and Safety Code is amended to read:

25177. The department may report findings and results of an investigation which the department undertakes pertaining to subject matter governed by this chapter, except for trade secrets as provided in Section 25173. The department may distribute such information as it considers necessary for the protection of the public or for the protection of human health, domestic livestock, wildlife, and the environment and to ensure the best use of natural resources. The department may publish reports summarizing or containing any order of the director or any judgment or court order which has been rendered pursuant to this chapter, including the nature of the charge and its disposition.

SEC. 22.5. Section 25178 is added to the Health and Safety Code, to read:

25178. On or before January 1, 1983, and on or before January 1st of each odd-numbered year thereafter, the department shall prepare and submit to the Legislature a report containing, but not limited to, the following:

(a) The status of the regulatory and program developments required pursuant to legislative mandates.

(b) The status of the hazardous waste facilities permit program.

(c) The status of the hazardous waste facilities siting program.

(d) The status of the hazardous waste abandoned sites program.

(e) A summary of enforcement actions taken pursuant to this chapter and any other actions relating to hazardous waste management.

(f) Summary data on annual quantities and types of hazardous waste generated, transported, treated, stored, and disposed.

(g) Summary data regarding onsite and offsite disposition of hazardous waste.

(h) Research activity initiated by the department.

(i) Regulatory action by other agencies relating to hazardous waste management.

(j) Any other data considered pertinent by the department to hazardous waste management.

SEC. 23. Section 25180 of the Health and Safety Code is amended to read:

25180. The standards and regulations adopted by the department pursuant to Section 25150 shall be enforced by the department or any local health officer or any local public officer as designated by the director.

SEC. 24. Section 25189 of the Health and Safety Code is amended to read:

25189. (a) Any person who intentionally or negligently makes any false statement or representation in any application, label, manifest, record, report, permit, or other document, filed, maintained, or used for purposes of compliance with this chapter, shall be liable for a civil penalty not to exceed twenty-five thousand dollars ($25,000) for each separate violation or, for continuing intentional violations, for each day that violation continues.

(b) Except as provided in subdivision (c), any person who intentionally or negligently violates any provision of this chapter or any permit, rule, regulation, standard, or requirement issued or promulgated pursuant to this chapter, shall be liable for a civil penalty not to exceed twenty-five thousand dollars ($25,000) for each violation of a separate provision or, for continuing intentional violations, for each day that violation continues.

(c) Any person who intentionally or negligently disposes of any hazardous waste at a point which is not authorized according to the provisions of this chapter shall be subject to a civil penalty of not more than twenty-five thousand dollars ($25,000) for each violation and may be ordered to disclose the fact of this violation or these violations to such persons as the court may direct. Each day on which such deposit remains and that person has knowledge thereof is a separate additional violation, unless the person immediately files a report of the deposit with the department and is complying with any order concerning the deposit issued by the director or a court of competent jurisdiction for such cleanup.

(d) Each civil penalty imposed for any separate violation pursuant to this section shall be separate and in addition to any other civil penalty imposed pursuant to this section or any other provision of law.

SEC. 25. Section 25191 of the Health and Safety Code is amended to read:

25191. (a) Any person who knowingly does any of the following acts shall, upon conviction, be punished by a fine of not more than twenty-five thousand dollars ($25,000) for each day of violation, or by imprisonment in the county jail not to exceed one year, or both such fine and imprisonment. If the conviction is for a violation committed after a first conviction of such person under this section, such person shall be punished by imprisonment in the state prison for 16, 20, or 24 months, or in the county jail for not to exceed one year, or by a fine of not more than fifty thousand dollars ($50,000) per day of violation, or by both such fine and imprisonment:

(1) Makes any false statement or representation in any application, label, manifest, record, report, permit, or other

document filed, maintained, or used for the purposes of compliance with this chapter.

(2) Has in his or her possession any record relating to the generation, storage, treatment, transportation, disposal, or handling of hazardous waste required to be maintained pursuant to this chapter, that has been altered or concealed, whether altered or concealed prior to January 1, 1982.

(3) Destroys, alters, or conceals any record relating to the generation, storage, treatment, transportation, disposal, or handling of hazardous waste required to be maintained pursuant to this chapter.

(4) Withholds information regarding a real and substantial danger to the public health or safety when such information has been requested by the department in writing and is required to carry out the department's responsibilities pursuant to the provisions of this chapter in response to a real and substantial danger.

(b) Any person who knowingly does any of the following acts shall, upon conviction, be punished by a fine of not more than fifty thousand dollars ($50,000) for each day of violation, or by imprisonment in the county jail not to exceed one year or both such fine and imprisonment. If the conviction is for a violation committed after a first conviction of such person under this section, such person shall be punished by imprisonment in the state prison for 16, 20, or 24 months, or in the county jail for not to exceed one year, or by a fine of not more than fifty thousand dollars ($50,000) per day of violation or by both such fine and imprisonment.

(1) Transports any hazardous waste to a facility which does not have a permit from the department issued pursuant to this chapter, or to any point which is not authorized according to the provisions of this chapter.

(2) Treats, stores, or disposes of any hazardous waste at a facility which does not have a permit from the department issued pursuant to the provisions of this chapter, or at any point which is not authorized according to the provisions of this chapter.

SEC. 26. Section 25202 of the Health and Safety Code is amended to read:

25202. Compliance with conditions on the hazardous waste facilities permit and with regulations adopted by the department pursuant to this chapter shall be required to sustain the validity of such permit. The department shall impose conditions on such permit, specifying the types of hazardous wastes which may be accepted for treatment or disposal, special operating conditions, requirements for evidence of financial responsibility for liabilities which may be incurred in the operation of the facility, provision of bond or other sureties to cover the costs of monitoring, maintaining, and closing the facility, and of postclosure security, and changes in the operation of the permitted facility necessary to comply with the regulations promulgated pursuant to this chapter. The department may impose other conditions on such permit which are consistent with the intent of this chapter.

SEC. 28. Article 9.5 (commencing with Section 25206) is added to Chapter 6.5 of Division 20 of the Health and Safety Code, to read:

Article 9.5. Hazardous Waste Management Council

25206. There is in state government a Hazardous Waste Management Council. The council shall consist of the following 16 members:

(a) The State Director of Health Services or a designated representative.

(b) The chairperson of the State Water Resources Control Board or a designated representative.

(c) The chairperson of the State Air Resources Board or a designated representative.

(d) The chairperson of the State Solid Waste Management Board or a designated representative.

(e) Three members appointed by the Speaker of the Assembly as follows:

(1) One member of the State Assembly.

(2) One representative who belongs to a California municipal association.

(3) One representative who belongs to a California association connected with the waste management industry.

(f) One member of the State Senate appointed by the Rules Committee of the Senate.

(g) Two members appointed by the President pro Tempore of the Senate as follows:

(1) One representative who belongs to a California association connected with the chemical manufacturing industry.

(2) One representative who belongs to a California environmental association.

(h) Three members appointed by the Governor as follows:

(1) One representative who belongs to a public interest group.

(2) One representative who shall be a registered geologist experienced in toxic and solid waste disposal and groundwater protection.

(3) One representative who shall be a chemical engineer experienced in the waste management field.

(i) One representative selected by the County Supervisors Association of California, who shall be a member of the board of supervisors from a county which is not represented through the association pursuant to subdivisions (j) and (k) and that county is not within a metropolitan statistical area as defined in the federal census.

(j) One representative appointed by the Association of Bay Area Governments.

(k) One representative appointed by the Southern California

Association of Governments.

The appointments required to be made pursuant to subdivisions (e), (f), (g), and (h) shall be made on or before March 1, 1982.

25207. (a) The chairperson of the council shall be elected by the council.

(b) A vacancy occurring on the council shall be filled in the same manner as the original appointments.

(c) All meetings of the council shall be subject to the state open meeting law contained in Article 9 (commencing with Section 11120) of Chapter 1 of Part 1 of Division 3 of the Government Code. A majority of the total membership of the council shall constitute a quorum for the transaction of official business.

(d) Members of the council shall serve without compensation, but shall be entitled to reimbursement for actual and necessary expenses.

(e) The members appointed who are members of the Senate and the Assembly shall meet with, and participate in, the work of the council to the extent that their participation is not incompatible with their position as Members of the Legislature. For the purposes of this article, the council members who are Members of the Legislature shall constitute a joint interim legislative committee on the subject of this article.

(f) The council shall cease to exist on January 1, 1984.

25208. Prior to January 1, 1983, the Hazardous Waste Management Council shall prepare a Hazardous Waste Management Plan which shall include all of the following elements:

(a) The development of a statewide hazardous waste facilities siting and permit process which will provide for, but not be limited to, the following:

(1) Public participation in the site selection and permit process.

(2) Local government and regional council government and regional government participation in the site selection and permit process.

(3) Maximum facility applicant and local community discussion to determine local permit conditions and applicant actions to offset risks imposed by the facility.

(4) Opportunity for negotiation and arbitration over siting and facility disputes.

(5) Incorporation of statewide and regional hazardous waste facility needs in the siting and local permit process and alternatives to meet those needs.

(b) Recommendations regarding legislative, administrative, and economic mechanisms necessary to assist in the siting of new hazardous waste facilities including those actions necessary to implement the process developed pursuant to subdivision (b), including consideration of the need for the council to be reestablished with additional powers.

(c) Recommendations to the Legislature regarding legislative, administrative, and economic mechanisms necessary to ensure that all persons, particularly those in communities where hazardous wastes are treated and disposed of, shall be fully compensated for injury or damage caused by hazardous materials.

25208.3. The department shall present, at the first meeting of the council, all available reports and information in its possession on all of the following subjects, or, if any type of such information on such subjects is not available, the department shall explain why it is not available:

(a) A compilation and review of all current and projected production of hazardous waste. This compilation shall incorporate present and projected data on:

(1) The types of hazardous wastes being generated in each county.

(2) The amount and type of waste being imported and exported.

(3) The sites currently being used for the disposition of these wastes within the state as well as the existing capacities and lifespans of such sites.

(b) A proposal for a reasonable geographic distribution of hazardous waste disposal facilities to fulfill the state's need for hazardous waste treatment, storage, or disposal for the next 25 years. This proposal shall be based on, but not limited to, the following:

(1) Location of generators.

(2) The amount and type of waste being generated in the state.

(3) The amount and type of waste being imported and exported.

(4) Health and environmental safety.

(5) Economics of transportation and the risk associated with such transportation.

(6) Capacity and lifespan of existing hazardous waste sites.

(c) A determination of those site selection criteria which will ensure that hazardous waste facilities may be established without causing unacceptable environmental or public health effects. These criteria shall include, but not be limited to, the following:

(1) Health and environmental impact factors.

(2) Hydrological, geological, and climatic factors.

(3) The adequacy of access to the site.

(4) The risk and impact of accidents during the transportation of hazardous waste.

(5) Local zoning and other land use regulations.

(6) Population density considerations.

(7) Closure and postclosure monitoring and maintenance requirements.

(8) The risk of fires and explosions.

(9) Other criteria that the council deems appropriate and necessary.

(d) An investigation and analysis of methods or technologies and incentives for source reduction, reuse, recycling or recovery of potentially hazardous waste and a strategy for encouraging and promoting those methods.

(e) An investigation and analysis of alternative methods for treatment and disposal of hazardous waste.

The unavailability of information on any of the subjects identified in subdivisions (a) to (e), inclusive, shall not be construed as restricting or limiting the authority of the council to discharge its responsibilities.

25208.5. (a) Prior to the completion of a final plan, the council shall prepare a preliminary draft plan. The preliminary draft plan shall be distributed to local units of government and regional councils of government throughout the state. The council shall establish a system whereby notice of the availability of the plan is disseminated throughout the state and shall also issue a statewide news release announcing the availability of the draft and how it may be reviewed or obtained.

(b) The council shall conduct not less than three public hearings throughout the state at diverse geographical locations. The first public hearing shall not be held until 60 days have elapsed from the date of the notice announcing the availability of the draft. The notice of the hearing shall be widely publicized within the area. Within 30 days after the hearings are completed, the council shall prepare a written summary of the comments received, provide comments on the major concerns raised at the hearings, and make appropriate amendments to the preliminary draft. The council shall submit a completed final plan upon completion of this review process, but prior to July 1, 1983, with the comments and amendments, to the Governor and the Legislature.

25209. (a) All state agencies shall provide assistance to the council in carrying out the council's responsibilities.

(b) The council may contract for consulting studies it deems necessary to enable it to carry out its assigned duties.

25209.5. This article shall remain in effect only until January 1, 1984, and as of such date is repealed, unless a later enacted statute, which is chaptered before January 1, 1984, deletes or extends such date.

SEC. 29. If Assembly Bill 70 is chaptered, whether before or after this bill, and amends Section 25189 of the Health and Safety Code, the amendments made to that section by AB 70 shall prevail over the amendments made to that section by this bill, and therefore, in that event, Section 24 of this bill shall not become operative.

SEC. 30. If Assembly Bill 70 is chaptered, whether before or after this bill, and amends Section 25191 of the Health and Safety Code, the amendments made to that section by Assembly Bill 70 shall prevail over the amendments made to that section by this bill, and therefore, in that event, Section 25 of this bill shall not become operative.

SEC. 31. No appropriation is made and no reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution or Section 2231 or 2234 of the Revenue and

Taxation Code because the only costs which may be incurred by a local agency or school district will be incurred because this act creates a new crime or infraction, changes the definition of a crime or infraction, changes the penalty for a crime or infraction, or eliminates a crime or infraction.

SEC. 32. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution shall go into immediate effect. The facts constituting the necessity are:

In order that urgently needed programs for the proper management of hazardous waste to protect the public health and safety and the environment may be commenced during the 1981–82 fiscal year, it is necessary that this act take effect immediately.

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LAND DISPOSAL RESTRICTION REGULATIONS

Adopted By The
Department of Health Services
State of California
November 24, 1982

(1) Adopt new Section 66122 to read:

66122. Land Disposal Method.

(a) "Land disposal method" means:

(1) Disposal of hazardous wastes on or into the land, including, but not limited to, landfill, surface impoundment, waste piles, deep-well injection, land spreading, and co-burial with municipal garbage.

(2) Treatment of hazardous wastes on or in the land, such as neutralization and evaporation ponds and land farming, where the treatment residues are hazardous wastes and are not removed for subsequent processing or disposal within one year.

(3) Storage of hazardous wastes on or in the land, such as waste piles and surface impoundments, other than neutralization and evaporation ponds, for longer than one year.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code.

(2) Adopt new Article 15, Sections 66900, 66905, 66910, 66915, 66920, 66925, 66930 and 66935, to read:

Article 15. LAND DISPOSAL RESTRICTIONS.

66900. List of Restricted Hazardous Wastes.

The following hazardous wastes are subject to the restrictions specified in this article:

(a) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing free cyanides at concentrations greater than or equal to 1000 mg/l.

(b) Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing the following dissolved metals (or elements) or compounds of these metals (or elements) at concentrations greater than or equal to those specified below:

Arsenic and/or compounds (as As)	500 mg/l
Cadmium and/or compounds (as Cd)	100 mg/l
Chromium (VI) and/or compounds (as Cr VI)	500 mg/l
Lead and/or compounds (as Pb)	500 mg/l
Mercury and/or compounds (as Hg)	20 mg/l
Nickel and/or compounds (as Ni)	134 mg/l
Selenium and/or compounds (as Se)	100 mg/l
Thallium and/or compounds (as Th)	130 mg/l

(c) Liquid hazardous wastes having a pH less than or equal to two (2.0).

(d) Liquid hazardous wastes containing polychlorinated biphenyls at concentrations greater than or equal to 50 mg/l.

(e) Hazardous wastes containing halogenated organic compounds in total concentration greater than or equal to 1000 mg/kg.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code. Reference: Sections 25140, 25150, 25159 and 25159.5, Health and Safety Code.

66905. Land Disposal Restrictions and Schedule.

(a) On and after each restriction date listed below, no person shall use any land disposal method for the specified restricted hazardous wastes, except as provided in this section and Sections 66910 through 66935.

(1) June 1, 1983 - cyanide wastes as described in Section 66900(a).

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(2) January 1, 1984 - toxic metal wastes as described in Section 66900(b); acid wastes as described in Section 66900(c); and polychlorinated biphenyls as described in Section 66900(d).

(3) January 1, 1985 - liquid wastes containing halogenated organic compounds as described in Section 66900(e).

(4) July 1, 1985 - organic sludges and solids containing halogenated organic compounds as described in Section 66900(e).

(b) At least forty-five (45) days prior to each restriction date listed above, the Department will make a determination as to whether sufficient recycling and treatment capacity will be permitted and fully operational in the State on the date of the restriction to process substantially all of the hazardous wastes to be restricted from land disposal on the restriction date. In making this determination, the Department will solicit public comments and hold a public hearing at least sixty (60) days prior to each restriction date and shall consider, but shall not be limited to, the following:

(1) The technical feasibility of the recycling or treatment processes to process substantially all of the restricted hazardous wastes subject to the restriction;

(2) The proximity of the recycling or treatment processes to generators of the restricted hazardous wastes; and

(3) The technical and economic feasibility of waste reduction, recycling, or treatment of the restricted hazardous wastes at the point of generation.

(c) If the Department determines that processes will not be available to recycle or treat substantially all of the restricted hazardous wastes in a particular category, the Department will revise the restriction date pursuant to the Government Code (Sections 11340, et seq.) in order that restrictions will not become effective prior to the availability of such processes.

(d) The Department will notify all hazardous waste recycling, treatment, storage, and disposal facility operators by letter within fifteen days after the date has been revised and shall publish a notice in the California Administrative Notice Register.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code.

66910. Land Disposal of Lab Packs Containing Restricted Hazardous Wastes.

Small containers of listed restricted hazardous wastes in lab packs may be placed in a landfill until the restriction date in Section 66905(a)(4), if the following requirements are met:

(a) Restricted hazardous waste must be packaged in inside containers which are non-leaking, tightly and securely sealed, and of a design and constructed of a material that will not react dangerously with, be decomposed by, or be ignited by the waste held therein. The inside containers must be of the size and type specified in the Department of Transportation (DOT) hazardous materials regulations (49 CFR Parts 173, 178 and 179, as they existed on 17 November 1981), if those regulations specify a particular inside container for the waste.

(b) The inside containers must be overpacked in an open head DOT-specification metal shipping container (49 CFR Parts 178 and 179, as they existed on 17 November 1981) of no more than 110 gallon capacity and surrounded by, at a minimum, a sufficient quantity of absorbent material to completely absorb all of the liquid contents of the inside containers. The metal outer container must be full after packing with inside containers and absorbent materials.

(c) The absorbent material used must not be capable of reacting dangerously with, being decomposed by, or being ignited by the contents of the inside containers.

(d) Incompatible wastes, as defined by Section 66108 shall not be placed in the same outside containers.

NOTE: Authority cited: Sections 208 and 25150, Health and Safety Code. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code.

66915. Dilution of Restricted Hazardous Wastes.

A hazardous waste listed as a restricted hazardous waste in Section 66900 shall be considered a restricted hazardous waste for purposes of this article even though it has been diluted to a concentration less than the listed concentration threshold by the addition of other hazardous waste or any other material during waste handling, transportation, treatment or storage. Dilution which occurs as a normal part of a manufacturing process shall not be considered dilution for purposes of this section.

NOTE: Authority cited: Sections 208 and 25150, Health and Safety Code. Reference: Sections 25150 and 25154, Health and Safety Code.

66920. Permit Conditions.

Nothing in this article shall prevent the Department from enforcing existing permit conditions for the land disposal of hazardous wastes that are more stringent than the restrictions of this article or imposing more stringent restrictions on the land disposal of hazardous wastes as permit conditions at any particular land disposal facility.

NOTE: Authority cited: Sections 208 and 25150, Health and Safety Code. Reference: Sections 25150 and 25202, Health and Safety Code.

66925. Categorical Exemptions From Land Disposal Restrictions.

(a) The following hazardous wastes or land disposal methods are exempt from the land disposal restrictions contained in this article:

(1) Drilling fluids, produced waters, and other fluids or materials which are brought to the surface in conjunction with the exploration, development, or production of crude oil or natural gas, and which are reinjected.

(2) Mining overburden as defined by the Surface Mining and Reclamation Act, Public Resources Code, Sections 2710, et seq. deposited within the mining permit area pursuant to a Surface Mining and Reclamation Act permit.

(3) Contaminated soil from cleanup of any hazardous waste site pursuant to approval by the Department, unless the Department determines that a recycling or treatment process is technically and economically feasible to render the contaminated soil no longer a listed restricted hazardous waste.

(b) Hazardous wastes or land disposal methods that are exempt from the land disposal restrictions of this article remain subject to all of the other provisions of this chapter.

NOTE: Authority cited: Sections 208 and 25150, Health and Safety Code. Reference: Section 25150, Health and Safety Code.

66930. Variances From Land Disposal Restrictions.

(a) Any person may petition the Department for a variance from the land disposal restrictions of this article for a specific waste stream or a site-limited land disposal method. The petitioner shall include information supporting the variance petition concerning the factors listed in (f) below.

(b) The Department may immediately deny a variance petition that is substantially unsupported by information relevant to the factors listed

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in subsection (f) below. The Department shall notify the petitioner within fifteen (15) days after a variance petition has been summarily denied.

(c) If the variance petition is not immediately denied in accordance with subsection (b) above, the Department shall notify the public of the variance petition within thirty (30) days of receipt and shall accept written comments concerning the variance petition for (30) days after notification. Any person may request a public hearing concerning a variance petition. The Department shall hold a public hearing whenever there is, on the basis of comments, a significant degree of public interest in a variance petition. The public hearing shall be held within thirty (30) days after the close of the comment period. The Department may combine the hearings on as many variance petitions as practicable.

(d) Within thirty (30) days after the close of the comment period, or the public hearing, if one is held, the Department shall issue a decision to the petitioner approving or denying the variance petition, and shall publish the decision within thirty (30) days after the issuance of the decision. Failure of the Department to issue the decision approving or denying the variance petition within the specified time will be deemed approval of the variance petition.

(e) The Department may grant a variance subject to special conditions, such as the type of land disposal method that may be used for a restricted hazardous waste or the manner in which the land disposal of a restricted hazardous waste may be performed, and may limit variances to specified time periods. All variances granted under this section are subject to review at the discretion of the Department.

(f) The Department may consider all relevant information including previously submitted data on a given waste stream or land disposal method in

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approving or denying a variance petition for a substantially similar waste stream or land disposal method. In making the decision to approve or deny a variance petition the Department shall determine whather the land disposal of the particular hazardous waste or the disposal of restricted hazardous wastes by a particular land disposal method poses a present or potential hazard to public health, to domestic livestock, to wildlife, or to the environment. In making this determination the Department shall consider the following factors:

(1) The acute or chronic toxicity of the restricted hazardous waste to humans, domestic livestock, or wildlife if ingested, absorbed through the skin, or inhaled.

(2) The mobility of the restricted hazardous waste in a land disposal environment.

(3) The persistence of the restricted hazardous waste in a land disposal environment.

(4) The ability of constituents of the restricted hazardous waste to bioaccumulate in plants or animals.

(5) The ability of the land disposal practice to totally isolate restricted hazardous wastes from the environment.

(g) If the petitioner presents information concerning the factors listed below to support the variance petition, the Department shall consider those factors, in conjunction with the factors listed in (f) above, in making the decision to approve or deny a variance petition:

(1) The petitioner's good faith efforts to seek out and investigate the availability of processes to recycle or treat the particular restricted hazardous waste, and the unavailability of such processes.

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(2) Whether information submitted demonstrates that increased costs from the use of available recycling or treatment processes which, when compared to land disposal, would create a severe economic hardship for the petitioner.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code.

Reference: Sections 25150, 25152, 25159 and 25159.5, Health and Safety Code.

66935. Emergency Variances.

(a) After the date specified in Section 66905 for the imposition of the restriction on the land disposal of a particular restricted hazardous waste, materials resulting from the cleanup of spills of that restricted hazardous waste, or spills of hazardous materials resulting in the creation of a hazardous waste meeting the definition of that restricted hazardous waste shall not be disposed on or into the land without a variance obtained from the Department. The variance may be requested by telephone and the Department may grant the variance for the land disposal of spill material immediately upon notification if there are no recycling or treatment processes available to render the spill material no longer a listed restricted hazardous waste.

(b) The Department may also grant an emergency variance in writing for the land disposal of a particular restricted hazardous waste to a generator if the recycling or treatment facility (on-site or off-site) relied upon by that generator experiences an unplanned shut-down, and if:

(1) There are no other recycling or treatment processes available in the State to process the particular restricted hazardous waste, and

(2) Insufficient storage capacity exists at the generator's site and the recycling or treatment facility to store the restricted hazardous waste for the expected duration of the shut-down.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code.

Reference: Sections 25150, 25152, 25259 and 25159.5, Health and Safety Code.

Mr. **Scheuer**. Thank you for your really truly outstanding testimony. It is obvious that you reflect the State in the Union that has perhaps done the most imaginative and thorough job in limiting noxious and poisonous effects of land dumping of toxic wastes. To my mind, it is absolutely an offensive national policy.

Congressman Brown.

Mr. **Brown**. Thank you very much, Mr. Scheuer.

I do have a couple of questions that I would like to ask. First of all, Mr. Nosenchuck, I am interested in your monitoring procedures in the State of New York. I would appreciate it if you would comment just a little bit more on the type of monitoring that is done by the monitors or inspectors that are assigned to specific dump operations or waste disposal sites, and whether or not your monitoring program includes any effort to ascertain the epidemiology of the sites. Is there an effort made to verify the health status of those who might be affected by water supply problems in the vicinity, or any other aspects of the contamination that might result from a particular site?

Mr. **Nosenchuck**. In response to the question on onsite environmental monitors, we have this in place right now. We require as a permit condition that our secure chemical land burial facilities provide funds to the State. I believe we receive approximately $100,000 from CECOS and SCA and some other funds from other facilities, but these are our two large chemical land burial facilities.

We have three or four people onsite at all times. We will not permit a facility to operate unless one of those people is on site. In other words, any time that facility is operational, our people are there. This is in addition to the routine work that we do, our normal inspections, our RCRA hazardous waste management inspections. From time to time, we have some of our environmental conservation officers—these people who work for us in the Department have the same status as the State police—at the gate, and we check every single shipment that comes. This is part and parcel of what we do.

I might add also that we do require very explicit operating procedures, closure and postclosure types of operations during the course of the permit process. We do not check for the epidemiology as part of our ongoing operation. We look to our State Department of Public Health to do that type of activity.

However, in connection with the work that does go on at the site, we believe that once we got the attention of our operators that we meant business in New York State and that permits would not be issued, and if they wanted to challenge us in court, we would be pleased to see them there—but it is our position that the Environmental Conservation Commissioner, under State law, has these broad powers—once we got their attention, these companies became very cooperative.

Not only did they provide the funds to us for these onsite environmental monitors, but there is another aspect of the program in New York that I think deserves some attention, and that is what we call our 10-year plan to move away from land disposal and to move into other methods of high technology, and this plan is updated annually. This is also a condition of our permit. I believe I expounded on that in my expanded remarks.

It is a mistake on the part of the Federal Government to permit a commercial secure land burial facility unless there is a full-time—three or four or one, depending upon the size of the facility—full-time environmental monitors on there, in addition to everything else that the State government and the Federal Government has to inspect and look at. You cannot depend on the facility operator to take care of the situation on his own. You must have other people there.

Mr. BROWN. Thank you.

Mr. Stoddard, you are acquainted with the facility that exists in my district, the so-called Stringfellow acid pit. I suspect that will continue to be a problem for some time.

I am wondering if you would make a few comments about that facility. For one thing, under the rules that the State has adopted at the present time, would such a facility be permitted to exist today? Are there alternatives for the treatment of the kinds of wastes that went in there which, as I understand it, were acids and heavy metals basically? Are there adequate ways of disposing of that kind of waste under California's present exclusions?

Mr. STODDARD. Mr. Brown, as you know, there are a wide variety of problems with the Stringfellow Quarry—the Stringfellow acid pits. One is that it was a bad site to begin with, and we know that now in retrospect. At one time, it was considered to be a good site for waste disposal. Today we know that is not true.

Mr. BROWN. Is that because of the seepage that occurs?

Mr. STODDARD. Yes. Geologically, it is not a good site, and it took us many years to make that determination.

Also, we put some very bad actors in that particular facility. We put strong acids, a wide variety of highly toxic metals, DDT, and who knows what else into that land disposal facility for many years. Today, under California law and regulations, I don't think that site would have been permitted to begin with as a land disposal site, although I am not absolutely sure of that. More importantly, under the regulations we just adopted materials that went into that land disposal facility that are responsible for the contamination that we see today would not have been allowed to be placed in that land disposal facility. The strong acids, metals, and halogenated materials would have been prohibited from being deposited in the Stringfellow Quarry. We would not have the problem today.

Mr. BROWN. I would like, if you have the information to answer this or comment on it, to look at the economics of that disposal site. I am informed in a general way it may take $30 million or $40 million to clean that up. It may ultimately mean that everything in that site will have to be taken out and put somewhere else or disposed of in some safe way. I am wondering how that would compare with the fees that were charged for disposing of the wastes that went in there over the lifetime of the site.

It may not be that this information is available, but I am focusing on the point that the lifetime costs of that site are going to be large when you count the full costs of disposal, and the public is going to end up bearing *x* percentage of that total lifetime cost. I am trying to get some figures that would help me to identify just what that transfer of cost from the original perpetrators or creators of the wastes and the operators of the dump compared to what the public is going to end up bearing.

Mr. Stoddard. There is no doubt that this is a very bad bargain, the Stringfellow Quarry. The low disposal fees looked attractive back in the late 1950's and early 1960's. Today, we are starting to realize what the true cost is. As you say, $30 million to $40 million has been kicked around as estimates to clean up that site.

What we are going to have to do is construct a treatment facility actually at that site. We are going to pump out contaminated materials and we are going to treat those materials. To do that at the same time we are trying to contain those materials from migrating into the broader environment is probably 10 or 15 or 100 times more expensive than if we had used good technologies at the time to neutralize the acids, to precipitate and extract the metals, and to incinerate the organics. It would have been much, much less expensive.

I think what we are seeing in California right now—we have done some pretty substantial economic analyses—and it shows that, right now, the materials that we are banning from land disposal costs California industries about $17 million to dispose of those materials in land disposals. If they have to go to more expensive treatment and incineration technologies, they are going to pay about an extra $15 million per year, about twice the cost of land disposal.

It sounds like a lot of money until you consider that when you add up what our industries are paying for State Superfund, Federal Superfund and privately financed cleanup activities, that is over $15 million right now. So I think the case can be made that, over the long term, it is going to be cheaper in real dollars and in avoided economic liability to go ahead and to use the safe technologies right now and avoid those massive cleanup costs in the future. Stringfellow is probably one of the best examples of that in California.

Mr. Brown. I have just one final question. Your comments bear on the economics of this, comparing the long-term versus the short-term economies. In general, do you feel that the analyses which you made in the State of California would be applicable on a national basis, and that we could realistically expect to see the same long-term economies if we analyzed the situation in all the States that we found in California?

Mr. Stoddard. Yes, I do. I don't think California is unique at all. I think the waste streams that you find in California, you will find in most other industrialized States. I think the technologies that we looked at as being the most appropriate for the safe management of those wastes would not be different in just about any State in the country. So I would be very surprised if the economics came out any differently in any major State than what we found in California.

Mr. Brown. Thank you, Mr. Stoddard.

Mr. Scheuer. Congresswoman Schneider.

Mrs. Schneider. I would like to apologize for being late. Unfortunately, I had another meeting going on at the same time, but I have been given a summary of your activities.

I would like the Chairman for unanimous consent to enclose a statement of mine in the record.

Mr. SCHEUER. By all means.

Mrs. SCHNEIDER. Thank you.

[The prepared statement of Mrs Schneider follows:]

STATEMENT OF THE HONORABLE CLAUDINE SCHNEIDER

December 8, 1982

Thank you, Mr. Chairman. I join the other Members of the Subcommittee in welcoming this opportunity to review the Environmental Protection Agency's new rules for the land disposal of hazardous waste.

There are two important questions for which I hope this hearing will provide some answers. The first is whether EPA's proposed regulations will actually provide for safe landfill disposal. According to the information we have so far, the liners and leachate protection systems required by the regulations are expected to be good for about 20-30 years. Given that we are trying to protect groundwater supplies which, once polluted, may take centuries to decontaminate, it would make more sense to decide now on a long range strategy to protect the public health. Temporary, half-way measures postpone, and ultimately increase, the cost to society of environmental protection.

The second concern I have is whether the EPA has paid sufficient attention to the alternatives to landfill, such as recycling and incineration. Our cities are running out of landfill space. If the EPA's regulations continue to make landfills a relatively cheap and easy method of disposal, the problem will be exacerbated, and potential long-range solutions to the hazardous waste problem -- such as recycling -- may be shut out of the market.

These issues couldn't be more important. The health of our constituents and the economic viability of some of our most important industries are at stake. I hope the testimony today will help us find some reasonable solutions.

Mrs. SCHNEIDER. I just have a quick question. I think that you two gentlemen are aware of the fact that in the fiscal 1983 budget, the financial assistance provided by the Federal Government to the States for hazardous waste management has been cut by 16 percent.

I am just curious to know if either of you gentlemen was involved in any efforts to persuade the decisionmakers to act otherwise?

Mr. NOSENCHUCK. Yes. As a matter of fact, I have testified in the previous 12 months, I think twice before the House and twice before the Senate, on this question. It is unfortunate that EPA is trying to kid the Congress and country that the knowledge is there and the resources are there. Additional knowledge is needed; high technology is needed; we must move away from dependence upon the land. Yet, EPA has yet to embrace that wholeheartedly.

The resources to carry out this work just aren't there, neither at the Federal nor at the State levels. We are kidding ourselves. It is unfortunate that EPA is moving in this direction. We are depending upon the Congress to look out for the interests of the States and the public of this country, not the EPA.

Mrs. SCHNEIDER. With all due respect to you, sir, and to my colleagues, I think that unless you went beyond the process of testifying before a committee, you probably would not reach as many decisionmakers as was necessary because we sorely lost in our effort to provide the funding to this area. I know that the other two witnesses who will be speaking later make a major effort in getting their message across. But it seems very sad to me that this Congress and this body are not getting the message, even though national polls clearly indicate the intelligence and the street wisdom that we have to move in this long-term approach.

So, if I might make a recommendation that you not only testify—sometimes there is a lack of attendance or tardiness—but also you provide letters and you get your Governor to really do a lobbying effort, because I think that that is the only way we are going to be able to get the majority to do what we think is right.

Mr. STODDARD. I want to make just one comment. I think this is excellent advice. The problem we face is there are so many battles to fight with the EPA right now that our efforts tend to get diffused. At some point we are talking about lifting the ban on the liquids in landfills which was a major concern, financial responsibility was a major battle, so the States feel a bit inundated as we try to keep track of what the EPA is actually doing in systematically dismantling our environmental programs.

Mrs. SCHNEIDER. So do we.

Mr. NOSENCHUCK. I would like to make an additional comment. The Association of State and Territorial Solid Waste Management Officials is a branch of the executive agencies in the States. We provide technical support to the National Governors Association. As a matter of fact, I participated in their meetings in Denver on Thursday and Friday of last week. We are working through NGA, who has that responsibility for lobbying, and we are providing that technical support to the National Governors Association.

I do believe that next year, the next calendar year, you will see a much stronger effort by the NGA in this area.

Mrs. SCHNEIDER. Very fine. Thank you very much.

Thank you, Mr. Chairman.

Mr. SCHEUER. There is a rollcall vote going on now, and we have had second bells, so we will recess for about 12 or 15 minutes.

[Recess.]

Mr. BROWN [presiding]. The subcommittee will resume.

Unfortunately, Chairman Scheuer has been called over to the Rules Committee on another matter and will be away for a while. But with the help of Mrs. Schneider, I think we can continue adequately.

You will be helpful, won't you?

Mrs. SCHNEIDER. Absolutely.

Mr. BROWN. I think we are ready to proceed with testimony from the next panel. We will call first, Mr. Melvin Goldberg, representing the New York Public Interest Research Center; and then Ms. Linda Greer, with the Environmental Defense Fund.

Mr. Goldberg.

Mr. GOLDBERG. Thank you, Congressman Brown.

My name is Mel Goldberg, and I am a staff attorney for the New York Public Interest Research Group, which is the largest statewide consumer and environmental advocacy organization in New York State. We have been working on the problems of toxic chemicals in the environment since our inception in 1973. We, therefore, greatly appreciate the opportunity to present our views to you today regarding the adequacy of EPA's recently promulgated regulations for land disposal of hazardous wastes.

At the outset, let me just echo the remarks of apparently virtually every other witness before you today and in the days last week, that NYPIRG does object to the very activity which these regulations seek to control. Based on our experience throughout the State, analysis by many other knowledgeable experts, and the statements by EPA itself in promulgating these regulations, land disposal of hazardous wastes is at best a highly risky enterprise. EPA concedes in their July printing of the regulations in the Federal Register that the technology doesn't currently exist to insure that land disposal will isolate the hazardous chemicals from the environment until they are nontoxic. Rather, the regulations merely seek to provide an adequate level of assurance that problems from the land disposal of these wastes will be maintained within acceptable limits, and then hope for the best.

While we can appreciate the practicalities, we believe the primary emphasis of the hazardous waste program should be on source reduction, recycling, and hazardous waste destruction through environmentally safe means. Land disposal should only be allowed for those materials for which there is no known safer substitutes, no known practical uses, and no known technology to safely destroy and detoxify them. This approach, while it would be consistent with RCRA as it currently reads, is quite clearly not the one being followed by EPA today. We believe Congress needs to determine why EPA has not followed this strategy and should take whatever remedial action that might be necessary to reorient the EPA in this regard—and many other regards, as well, I might add.

With that having been said, let me turn to the problems of the regulations before you today. I am going to rely heavily on my experience over the last 1½ years, working with a group of citizens in Port Washington, Long Island, N.Y.

Port Washington is located in Nassau County in the town of North Hempstead. The town has a population of approximately 225,000 people, and the solid waste landfill for the entire town is located on a site in the Port Washington sand pits. The pits are mined for their fine sand, which has been used extensively in building New York City.

In 1974, the town started to fill a portion of the pits with its municipal garbage. Rather than moving farthest away from an existing middle-class neighborhood, they chose to build it directly abutting the homes. The garbage was to be piled up within several hundred feet of the homes, starting about 100 feet below the grade of the neighborhood and gradually working its way up over a period of years to finally be at the same grade as the homes, which it currently is.

In spite of the vigorous protests and lawsuits by the neighbors, the town prevailed and was allowed to proceed on the assurance that no problems would, in fact, occur.

Eight years later, we have lived to see all of the worst fears of the neighbors more than confirmed. The U.S. EPA Region 2 is in the process of completing what Jacky Schaeffer, Regional Administrator of Region 2, calls the most indepth analysis of solid waste landfill that EPA Region 2, and perhaps all of EPA, has ever conducted.

I have with me today an executive summary of that report. The report itself has not been released by EPA yet. But the executive report will be submitted for the record.

The Nassau County Department of Health on November 12, 1982, also issued a thick study—I also have a copy of that with me which will be made a part of the record today—with both their own and EPA test results included and discussed. The facts are now in, and are largely undisputed. They are as follows:

Vinyl chloride, a known human carcinogen, is spewing out of the landfill at levels that range anywhere from 2,000 to 57,000 parts per billion [ppb].

New York's Air Guidance document lists as the acceptable ambient level [AAL] for vinyl chloride of 0.16 parts per billion. The AAL's in New York are set to keep additional cancer deaths to 1 per million people over a lifetime of exposure—admittedly a very low level on a very low risk but, nevertheless, that is the risk that New York State, in their wisdom, and we would very much support it, has chosen.

John Frisco, of EPA Region 2's Hazardous Waste Division, stated at a public meeting in Port Washington on November 30, 1982, that he believes that at least a part of the neighborhood is probably already at the AAL for vinyl chloride.

Methane gas explosions in neighborhood homes due to methane migration from the landfill occurred several times during the last several years, and numerous other explosive episodes were averted when the methane alarms in people's homes alerted them to evacuate and open all the windows, an event which sometimes occurs in the middle of the winter. These alarms look very similar to smoke alarms, but they sit on the floor, the kids play around them, and so on. But they do go off on occasion.

Ground water test wells outside the landfill report high levels of a number of organic chemicals which are also found in the leachate generated by the landfill. A nearby drinking water well has been shut down by the water district because of a reading of vinyl chloride in one of the samples.

An intense controversy is currently being waged over whether an elementary school which is within 1,000 feet of the landfill should be closed down either permanently or temporarily until the town can litigate the problems. An EPA confirmed reading of 1 part per billion of vinyl chloride was recorded on the edge of the school playground.

The town has now committed itself to manifolding all of the vent pipes which are in the landfill, pulling the vinyl chloride laden gas as far away from the homes as possible and flaring the gas there to destroy all of the toxics. This commitment was only made after a major campaign on the part of us and many others, including the "60 Minutes" documentary which was on last April, that alerted both the public in the area as well as the Nation, to the problem. The pipes had been put in to relieve the methane pressure and thereby lower the methane migration into the homes and neighborhood. So, in the effort to solve one problem, they created another.

Still in dispute are a number of questions such as: Has the PVC liner failed? Is it safe to live in the neighborhood? Are children safe who go to the school? Should the drinking water well be allowed to reopen? Is the vinyl chloride being produced by biologic action within the landfill, breaking down ordinary household products—as is the claim of Nassau County and, apparently, of EPA at this point—or is it appearing because of some illegal industrial dumping of vinyl chloride monomer? Hooker Chemical is the only known source of vinyl chloride monomer on Long Island. They stopped production in approximately 1974.

This whole investigation of the Port Washington landfill has unfolded against a backdrop of the town of North Hempstead seeking a State permit to expand the existing landfill of 40 acres by an additional 80 acres to increase its expected life by 24 years.

It should be noted that this landfill is not a hazardous waste landfill and, therefore, would not be subject to the regulations under consideration today. Rather, it is only a municipal solid waste landfill which, under RCRA, is supposed less dangerous than are hazardous sites. Accordingly, RCRA allows the State to play the major regulatory rôle for solid waste sites, assuming scrupulous Federal attention is not warranted.

We believe that a close analysis of the Port Washington landfill case reveals much of importance, both in regard to the adequacy of the hazardous waste regulations under your review today, as well as in regard to the regulatory scheme established by RCRA where solid waste sites receive less Federal scrutiny.

First, one of the major problems at Port Washington is air pollution caused by the landfill—methane, vinyl chloride, benzine, xylene, toluene, and a host of others too long for me to pronounce.

Yet, the proposed regulations require absolutely nothing with regard to air pollution control at these facilities. EPA even rejects a case-by-case approach, which it could achieve with a boilerplate narrative regulation to the effect that a permit applicant must demonstrate that air quality will not be degraded by the facility.

While it could be argued that solid waste sites present a greater air pollution threat than hazardous waste sites because of the petrusables which produce methane, such an argument would either strike at the RCRA assumption that solid waste sites are relatively safe, requiring little Federal involvement, or is factually incorrect, given the chemicals typically found in many hazardous waste sites. In any event, EPA does not claim that there are no air problems from hazardous waste facilities. Rather, they simply plead ignorance as to what to do about them, and then proceed as if there were no such problems.

At Port Washington, the people are not so good at forgetting about real problems. We are going to be sucking the gas off and destroying the toxic constituents at Port Washington. Jacky Schaeffer, at least among the EPA hierarchy, believes these remedial activities are urgently needed and has been pushing, apparently, the town to speed up its plans for manifolding. We believe that hazardous waste facilities must plan for air pollution control measures where appropriate. The regulations' total lack of attention to these substantial set of potential air pollution problems is literally totally unconscionable and unacceptable.

Second, the EPA regulations essentially require a synthetic membrane liner for hazardous waste landfills on the ground that only these "prevent wastes from passing into the liner." Unfortunately, EPA seems to be relying much too heavily on the design properties of the materials and largely ignoring the practical difficulties of how these materials are actually installed in the field. In a paper called "Membrane Liner Systems for Hazardous Waste Landfills," Proceedings of the 7th Annual Research Symposium on Land Disposal of Hazardous Waste—a copy of which I have here that will be submitted as part of the record today, and I will omit reading the site into the record—finds that punctures can be quite common in such liners due to vehicular movement over them during installation and landfill operation. And the liners must also be installed during proper weather conditions, and the field seams must be very carefully done and inspected.

While in theory these problems are not insurmountable, they do require considerable expertise and diligence. This can by no means be assumed to exist. See "Procedures for Installing Liner Systems," 8th Annual Research Symposium on Land Disposal of Hazardous Waste—a copy of that paper I have here to be submitted as a part of that record—wherein David W. Shultz of the Southwest Research Institute discusses field inspections, where synthetic membranes and other liner systems were installed, and in which he concludes there are a number of problems in making sure that the quality assurance for synthetic liners is maintained.

Because of the difficulty of properly installing and operating over a synthetic membrane liner such that it remains impermeable during its early life, and because of what we believe is the very strong evidence of liner failure of the 20-mil PVC liner at Port Washington, we have vigorously objected to the exclusive use of either a single or double synthetic liner for the Port Washington landfill addition. We strongly believe that 2 feet of clay with 10 to the −7 centimeters per second hydroconductivity or 4 to 6 inches of asphaltic concrete specially mixed for landfills, perhaps in combination with each other, or even in combination with an 80-mil high-density polyethylene, would be highly preferable to the use of a synthetic material alone. The synthetics look great on paper, but according to our engineering experts, they require far more care in installation and operation to protect their integrity. Furthermore, because of the short time in which synthetics have been in use, our experts have serious doubts about their long-term viability.

Perhaps a combination of synthetic and natural materials should be required—a belt and suspenders approach which is not unduly expensive considering the cost of the potential ground water problems to be avoided.

Third, the monitoring requirements are woefully inadequate in the regulations. They are nonexistent with regard to air pollution. Port Washington has an extensive air monitoring program, including gas monitoring wells for underground migrating gas—and now because of our hollering and screaming and national attention on "60 Minutes"—an ambient air sampling program is currently being done. Hazardous waste sites should certainly be treated with as much air monitoring resources and permanent requirements as is done for point sources which produced the hazardous materials in the first place, a policy which apparently the EPA has forgotten.

The ground water monitoring proposal is, of course, where EPA has chosen to put most of its eggs, if not all of its eggs. But then, in another act which can only be termed unconscionable, all monitoring is forgiven if only the permit applicant will install a double liner. While a double liner may indeed reduce the risk of a leak, it is certainly not reducing it to the level of zero risk, considering the aforementioned problems with installing and operating over synthetic liners, the liners which EPA requires. Even with a super natural-synthetic-quadruple special deluxe Cadillac liner system, we would still need the assurance that if something did leak through we would, at the very least, have a chance of knowing about it so that a rational decision could be made as to whether remedial actions are necessary.

At Port Washington, we have an extensive ground water program agreed to by all parties—it took 6 months to do it. But we are still pushing for the best double liner of natural materials or natural-synthetic combination we can get. We still have not reached agreement on that. We will be continuing to push in the months ahead.

EPA argues that the monitoring exemption will be a "carrot" to get permit applicants to invest in the more expensive, but much better, double liner. If it is so much better, why not require it instead of using the carrot and, in addition, keeping the tough ground water monitoring. This is not an academic exercise in seeing whether incentives can be effectively used for environmental protection. If EPA is interested in testing out new regulatory strategies, let them start out with something far less critically important than the control of the most dangerous materials known.

As a final point, let me just point out once again that the Port Washington landfill case also raises the question of what should be the role of EPA in solid waste disposal regulations. The Nassau County Health Department in its November 12 report—I have made it available to the committee—cites work done by Dr. Paul R. Wood indicating that vinyl chloride and other toxics are the natural byproducts of biologic activity in solid waste landfills containing only household products. The paper is called "Anerobic Transformation, Transport, and Removal of Volatile Chlorinated Organics in Groundwater."

If such is indeed the case, then solid waste landfills represent a much greater threat to the health of the citizenry than was previously believed. There seems to be an urgent need for Congress to review the RCRA strategy on solid waste sites to determine whether, as we believe, greater Federal control, even in the solid waste sphere, is warranted.

Thank you very much.

[The prepared statement of Mr. Goldberg follows:]

December 8, 1982

TESTIMONY OF MELVIN L. GOLDBERG, ESQ.
before
THE HOUSE SUB-COMMITTEE ON NATURAL RESOURCES, AGRICULTURAL RESEARCH
and ENVIRONMENT
on
THE SCIENTIFIC BASIS OF EPA'S REGULATIONS FOR LAND DISPOSAL OF
HAZARDOUS WASTE

My name is Mel Goldberg and I am a staff attorney for New York Public Interest Research Group, which is the largest statewide consumer and environmental advocacy organization in New York State. We have been working on the problems of toxic chemicals in the environment since our inception in 1973. We therefore greatly appreciate the opportunity to present our views to you today regarding the adequacy of EPA's recently promulgated regulations for land disposal of hazardous waste.

At the outset, let me simply state NYPIRG's objection to the very activity which these regulations seek to control. Based on our experience throughout the state, analysis by many other knowledgable experts, and the statements by EPA itself in promulgating these regulations, land disposal of hazardous waste is at best a highly risky enterprise. EPA concedes that the technology does not currently exist to ensure that land disposal will isolate the hazardous chemicals from the environment until they are non-toxic. Rather, the regulations merely seek to provide an adequate level of assurance that problems from the land disposal of these wastes will be maintained within acceptable limits.

While we can appreciate the practicalities, we believe that the primary emphasis of the hazardous waste program should be on source reduction, recycling, and hazardous waste destruction through environmentally safe means. Land disposal should only be allowed for those materials for which there is no known safer substitutes, no known practical uses, and no known technology to safely destroy and detoxify them. This anproach, while it would be consistent with RCRA, is quite clearly not the one being followed by EPA. We believe Congress needs to determine why EPA has not followed this strategy and should take whatever remedial action that might be necessary to to reorient EPA.

With that having been said, let me turn to the problems of the regulations before you today. I am going to rely heavily on my experience over the last year and a half working with a group of citizens in Port Washington, Long Island, New York.

Port Washington is located in Nassau County in the Town of North Hempstead. The Town has a population of approximately 225,000 people and the solid waste landfill for the entire town is located on a site in the Port Washington sand pits. The pits are mined for their fine sand which has been used extensively in building New York City.

In 1974 the Town started to fill a portion of the pits with its municipal garbage. Rather than moving farthest away from an existing middle class neighborhood they chose to build it directly abbutting the homes. The garbage was to be piled up within several hundred feet of the homes, starting about 100 feet below the grade of the neighborhood and working its way up over a period of years to finally be at the same grade as the homes.

In spite of the vigorous protests and lawsuits by the neighbors, the Town prevailed and was allowed to proceed on the assurance that no problems would, in fact, occur.

Eight years later we have lived to see all of the worst fears of the neighbors more than confirmed. The US EPA Region 2 is in the process of completing what Jacky Schaeffer, Regional Administrator, calls the most in depth analysis of a solid waste landfill that EPA Region 2 and perhaps all of EPA has ever conducted.

And the Nassau County Department of Health on November 12, 1982 also issued a thick study with both their own and EPA test results included and discussed. The facts are now in, and are largely undisputed. They are as follows:

- * Vinyl chloride, a known human carcinogen, is spewing out of the landfill at levels that range anywhere between 2000 and 57,000 parts per billion (ppb.)
- * New York's Air Guidance document lists as the Acceptable Ambient Level (AAL) for vinyl chloride of .16 ppb. The AAL's in New York are set to keep additional cancer deaths to 1 per million people over a life time of exposure.
- * John Frisco of EPA Region 2's Hazardous Waste division stated at a public meeting in Port Washington on November 30, 1982 that he believes that at least a part of the neighborhood is probably at the AAL for vinyl chloride.
- * Methane gas explosions in neighborhood homes due to methane migration from the landfill occurred several times during the last several years, and numerous other explosive episodes were averted when the methane alarms in people's homes alerted them to evacuate and open all windows (an event which sometimes occurs in the middle of the winter).
- * Groundwater test wells outside the landfill report high levels of a number of organic chemicals which are also found in the leachate generated by the landfill. A nearby drinking water well has been shut down by the Water District because of a reading of vinyl chloride in one of the samples.
- * An intense controversy is currently being waged over whether an elementary school which is within 1000 feet of the landfill should be closed down, either permanently or temporarily until the town can mitigate the problems. An EPA confirmed reading of 1.0 ppb of vinyl chloride was recored on the edge of the school playground.
- * The Town has now committed itself to manifolding allo of the vent pipes which are in the landfill, pulling the vinyl chloride laden gas as far away from the homes as is possible and flaring the gas there to destroy all of the toxics. The pipes had been put in to relieve the methane pressure and thereby lower the methane migration into the homes and neighborhood.

Still in dispute are a number of questions such as, Has the PVC liner failed? Is it safe to live in the neighborhood? Are children safe who go to the school? Should the drinking water well be allowed to reopen? Is the vinyl chloride being produced by biologic action within the landfill, breaking down ordinary household products, or is it appearing because of some illegal industrial dumping of vinyl chloride monomer?

And this whole investigation of the Port Washington landfill has unfolded against a backdrop of the Town of North Hempstead seeking a state permit to expand the existing landfill of 40 acres by an additional 80 acres to increase its expected life by 24 years.

It should be noted that this landfill is not a hazardous waste landfill and therefore would not be subject to the regulations under consideration today. Rather, it is only a municipal solid waste landfill, which under RCRA is supposedly less dangerous than are hazardous sites. Accordingly, RCRA allows the state to play the major regulatory role for solid waste sites, assuming scrupulous federal attention is not warranted.

We believe that a close analysis of the Port Washington landfill case reveals much of importance, both in regard to the adequacy of the hazardous waste regulations under your review today as well as in regard to the regulatory scheme established by RCRA whereby solid waste sites receive less federal scrutiny.

First, one of the major problems at Port Washington is air pollution caused by the landfill--methane, vinyl chloride, benzene, xylene, toluene, and a host of others too long to pronounce.

Yet the proposed regulations require absolutely nothing with regard to air pollution control at these facilities. EPA even rejects a case-by-case approach which it could acheive with a boiler plate narrative regulation to the effect that a permit applicant must demonstrate that air quality will not be degraded by the facility.

While it could be argued that solid waste sites present a greater air pollution threat than hazardous waste sites, because of the petrusables which produce methane, such an argument would either strike at the RCRA assumption that solid waste sites are relatively safe, requiring little federal involvement, or is factually incorrect, given the chemicals typically found in many hazardous waste sites. In any event, EPA does not claim that there are no air problems from hazardous facilities. They simply plead ignorance and then proceed as if there are no such problems.

At Port Washington, the people are not so good at forgetting about real problems. We're going to be sucking the gas off and destroying the toxic constituents. Jacky Schaeffer, at least among the EPA heirarchy, believes these remedial activities are urgently needed and has been pushing the Town to speed up its plans for manifolding. We believe that hazardous waste facilities must plan for air pollution control measures where appropriate. The regulations total lack of attention to these substantial set of potential air pollution problems is totally unconscionable and unacceptable.

Second, the EPA regulations essentially require a synthetic membrane liner for hazardous waste landfills, on the ground that only these "prevent wastes from passing into the liner." Unfortunately EPA seems to be relying too heavily on the design properties of the materials and largely ignoring the practical difficulties of how these materials are actually installed in the field. In a paper, Membrane Liner Systems for Hazardous Waste Landfills, Proceedings of the 7th Annual Research Symposium on Land Disposal of Hazardous Waste, EPA- 600/9-81-002b, March 81, Robert C. Gunkel of the US Army Engineers, finds that punctures can be quite common in such liners due to vehicular movement over them during installation and landfill operation. And the liners must also be installed during proper weather conditions, the field seams must be very carefully done and inspected.

While in theory these problems are not insurmountable, they do require considerable expetese and dilligence. This can by no means be assumed to exist. See Procedures for Installing Liner Systems, 8th Annual Research Symposium on Land Disposal of Hazardous Waste, EPA- 600/9-82-002, March 82, wherein David W. Shultz of the Southwest Research Institute discusses field inspections where synthetic membranes and other liner systems were installed.

Because of the difficulty of properly installing and operating over a synthetic membrane liner such that it remains impermeable during its early life, and because of what we believe is the very strong evidence of liner failure of the 20 mil PVC liner at Port Washington, we have vigorously objected to the exclusive use of either a single or double synthetic liner for the Port Washington landfill addition. We strongly believe that 2 feet of clay with 10^{-7} cm/sec hydroconductivity or 4-6" of asphaltic concrete specially mixed for landfills, perhaps in combination with each other, or even in combination of with 80 mil hdpe, would be highly preferable to the use of a synthetic material alone. The synthetics look great on paper, but according to our engineering experts require far more care in installation and operation to protect their integrity. Furthermore, because of the short time in which synthetics have been in use, our experts have serious doubts about their long term viability.

Perhaps a combination of synthetic and natural materials should be required--a belt and suspenders approach which is not unduly expensive considering the cost of the potential groundwater problems to be avoided.

Third, the monitoring requirements are woefully inadequate in the regulations. They are nonexistant with regard to air pollution. Port Washington has an extensive air monitoring program, including gas monitoring wells for underground migrating gas and ambient air sampling currently being done. Hazardous waste sites should certainly be treated with as much air monitoring resources and permit requirements as is done for point sources which produced the hazardous materials in the first place.

The ground water monitoring proposal is of course where EPA has chosen to put most of its eggs. But then in another act which can only be termed unconscionable all monitoring is forgiven if only the permit applicant will install a double liner. While a double liner may indeed reduce the risk of a leak, it is certainly not zero, considering the aforementioned problems with installing and operating over synthetic liners. Even with a super natural-synthetic-quadruple special deluxe Cadillac liner system we would still need the assurance that if something did leak through we would at the very least have a chance of knowing about it so that a rational decision could be made as to whether remedial actions are necessary.

At Port Washington, we've got an extensive groundwater program agreed to by all the parties. But we're still pushing for the best double liner of natural materials or natural-synthetic combination we can get.

EPA argues that the monitoring exemption will be a carrot to get permit applicants to invest in the more expensive but much better double liner. If its so much better, why not require it, instead of using the carrot? And in addition keeping the tough groundwater monitoring. This isn't an academic exercise in seeing whether incentives can be effectively used for environmental protection. If EPA is interested in testing out new regulatory strategies, let them start out with something far less critically important than the control of the most dangerous materials known.

As a final point let me just point out once again that the Port Washington landfill case also raises the question of what should the role of EPA be in solid waste disposal regulation. The Nassau County Health Department in its November 12 Report cites work done by Dr. Paul H. Wood indicating that vinyl chloride and other toxics are the natural by-products of biologic activity in solid waste landfills containing only household consumer products. "Anerobic Transformation, Transport, and Removal of Volatile Chlorinated Organics in Groundwater." Drinking Water Research Center, Florida International University, Miami, Florida, September 1981. If such is indeed the case, then solid wast landfills represent a much greater threat to the health of the citizenry than was previously believed. There seems to be an urgent need for Congress to review the RCRA strategy on solid waste sites to determine whether--as we believe--greater federal control is warranted.

Mr. **Brown.** Thank you, Mr. Goldberg.

I neglected to indicate for the record that in the event that we do not get the opportunity to ask all the questions that should go into the record, we would like to follow up with some written questions. I will just make that point at this time, and perhaps again, if I remember it.

Now, Ms. Greer, you may present your statement, and then we will question both of you at the end of that time.

Ms. **Greer.** On behalf of the Environmental Defense Fund, I am grateful for the opportunity to testify today concerning the hazardous waste landfill regulations.

I will testify today on four major problems with the regulations. The issues I will address are: Lack of regulation for air emission monitoring and control, which has just been discussed; lack of requirement to retrofit existing facilities with liners; lack of requirements to show financial capability to perform corrective action; and, finally, lack of requirement to clean up contamination which has migrated beyond the facility property boundary. There are many other problems in the regulations which I will not discuss today and, if the subcommittee desires, I can provide a complete evaluation of the regulations for the record.

The first is air emission monitoring. EPA has failed to address either monitoring or control requirements for hazardous air emissions at land disposal facilities. The agency justifies this omission with a statement that there is less information and experience on the air pollution problem at these facilities than on surface or ground water, and that the problem is dependent upon the nature of the particular waste being placed at the facility.

This position is in complete contradiction to the agency's previous statements. In the February 5, 1981 proposed land disposal regulations, the agency stated that improperly designed facilities could cause significant air emissions and required ambient air monitoring and appropriate response if contamination was detected.

There is no new data which justifies a change in agency position. In fact, evidence generated by studies largely funded by EPA itself clearly support the ability and need to monitor and control air emissions from land disposal facilities.

Theoretical studies using mathematical models have predicted that high levels of emissions will enter the air from these facilities. Monitoring studies which confirm these predictions have been performed at over 20 operating Superfund sites.

It is clear from the literature, however, that there is sufficient information about all relevant aspects of the air emissions problem for EPA to take prompt regulatory action.

Second, lack of requirement to retrofit existing facilities with liners and leachate collection systems. Without substantial justification, EPA has exempted existing portions of land disposal facilities from the containment design requirements of liners and leachate collection systems. By doing so, EPA abandons the notion of preventive action to control pollution from these potentially dangerous facilities and relies solely upon the ground water protection and response requirement to protect human health and the environment.

There are several significant problems with EPA's approach. I will discuss one here and refer the members of the committee to my written statement for the rest. First, protection of the public is entirely dependent upon the detection of contamination by ground water monitoring systems. Although ground water monitoring is an important part of the regulatory program, it is not foolproof, and our experience in installing ground water monitoring systems is limited. In fact, by the agency's own admission, "major deficiencies exist in our capability to perform ground water investigation."

The agency is by no means alone in its opinion that knowledge about ground water and ground water monitoring is relatively undeveloped. Similar opinions have been expressed in technical journals, editorials, and conference presentations by many prestigious ground water researchers and consultants. In fact, ground water expert Dr. David Miller, testifying before the subcommittee last week, substantially agreed with this statement.

EPA's justification for exempting existing facilities for liners and leachate collection systems is based on easily refutable grounds. Significantly, it is not based on cost. The agency does not allege it will be too costly to do it. In fact, EDF's calculations, done using EPA's figures, show that it would be cost effective for the overwhelming number of facilities to line their facilities rather than undergo costly corrective action once the facilities leak.

The Agency contends that the reason that existing facilities should be lined is that that will require removing waste, and removing waste may result in the shutdown of production facilities because some facilities may be integral to manufacturing processes. This contention is based on no factual grounds and has several important defects, two of which I will highlight orally.

First, it does not differentiate between facilities associated with manufacturing and those which are not. Second, it completely ignores the fact that production facilities will not be uniformly affected by a retrofitting requirement. Many manufacturing facilities have backup impoundments, have space to construct new impoundments, or empty their facilities to perform routine maintenance or dredging. In these instances, manufacturing processes will not be substantially affected by a retrofit requirement.

We are not aware of any data to support EPA's claim that manufacturing processes would be affected in many cases. Data collected by EDF during a survey of hazardous waste surface impoundments in Region 2 contradicts completely the agency's contention. This data is provided in my written statement for the record.

The limitations of the Agency's approach to regulating existing facilities are especially troublesome in light of the tremendous hazards these facilities pose to human health and the environment. In addition, because the siting of new facilities is proceeding so slowly, the population of landfills we will be dealing with over the next 5 to 10 years will be predominated by existing facilities.

EDF proposes that retrofitting should be required for existing portions of facilities as a general rule unless, one, site-specific considerations render the retrofitting option technologically infeasible using the best available technology; or two, the process of retrofitting the facility would pose a greater risk to human health and the environment than not retrofitting due to the danger of exhuming the waste. The burden would be on the applicant during the permitting process to prove a particular facility qualifies for the exemption.

There are several important advantages to this approach. First, exemptions from containment requirements will be granted on the basis of proven site-specific technological and environmental constraints, rather than unproven generalizations about the impact of retrofitting nationwide. Second, retrofitting will be required where it can be done safely, thus incorporating a preventive aspect to the regulation of existing facilities.

My third issue is the importance of financial responsibility for corrective action. There is a significant gap in EPA's regulatory coverage of hazardous waste land disposal facilities. The Agency's regulatory scheme relies on corrective action, yet requires no financial assurances that the corrective action will be performed. Thus, whether corrective action will actually be performed is out of EPA's control because it will largely depend upon the financial resources available to the owner/operator.

The lack of a mechanism to insure the performance of corrective action is a serious matter from both a legal and policy perspective. Requiring evidence of financial responsibility for corrective action is important to discourage the abandonment of facilities, assure full coverage of the costs of hazardous waste management, and provide incentives for better hazardous waste management.

Corrective action financial insurance requirements would help fill a large void in the financial responsibility area. The Agency has required land disposal facilities to provide financial assurances to cover liabilities to third parties for nonsudden releases occurring during the active life of the facilities. Yet, nothing is required for the owner/operator to remedy releases while they are onsite, before the releases become a liability. Assurances that contamination, when discovered, will be addressed onsite will reduce the exposure of any insurer of the third-party claim and should, in the long run, make such insurance easier and cheaper to obtain. Furthermore, to the extent the insurance is involved in providing corrective action financial assurances, opportunities would be provided to coordinate premium assessments, site inspections, and loss management for both offsite and onsite responsibilities.

Requiring financial assurances for corrective action will also provide a worthwhile nonregulatory incentive to make good siting and design decisions. The requirement encourages an evaluation of the long-term consequences of siting the facility in a particular location.

EDF has submitted extensive comments on the mechanisms available for demonstrating financial responsibility in a joint filing of comments on this issue with a major insurance company. These comments can be provided for the record.

My last issue is duty to clean up contamination past the compliance point. EPA does not require cleanup beyond the waste boundary of a hazardous waste disposal facility. Their rationale is that there is no guarantee that the owner or operator could obtain permission to enter neighboring property to conduct corrective action. Instead, EPA seeks to rely upon Superfund and other authorities to address the offsite contamination. This position is both absurd and unlawful.

Under the current scheme, the Agency would be forced to duplicate its efforts in cleaning up contamination from one source because it would be required to institute two separate actions to address the onsite and offsite contamination. This represents an intolerable waste of resources, assuming both actions are actually undertaken. In addition, EPA has shifted the burden of proving whether a risk exists from the applicant to the Agency, and this has made its task more difficult and time consuming. It has also significantly altered the level at which cleanup action is warranted by relying solely upon other authorities. In short, the Agency has crafted an unacceptably difficult methodology to protect the public health from offsite contamination.

The issues of air emissions monitoring, standards for existing facilities, financial responsibilities for corrective actions, and duty to clean up past the contamination point are not EDF's only concerns in the landfill regulations. At the core of the issues I have not discussed is the following problem: EPA has proceeded as if their engineering designs are failproof and is, in some areas, trying not to find contamination.

For example, as has been discussed, where a double liner and a leachate collection/detection system has been installed, the Agency exempts a facility from ground water monitoring requirements. The psychology of this approach is understandable. EPA would like to think that these regulations are based on infallible principles and sound science and will prevent any contamination. However, by their own admission in their preamble, these landfills will surely leak at some point in time. Since the Agency is charged with protecting human health and the environment, we feel they are obligated to take maximum measures to insure that the waste is contained and, just as important, that they detect any waste that escapes containment.

Thank you.

[The prepared statement of Ms. Greer follows:]

ENVIRONMENTAL DEFENSE FUND

TESTIMONY OF LINDA E. GREER
SCIENCE ASSOCIATE

ENVIRONMENTAL DEFENSE FUND

AT THE HEARINGS ON HAZARDOUS WASTE
LAND DISPOSAL REGULATIONS

OF THE SUBCOMMITTEE ON NATURAL RESOURCES,
AGRICULTURAL RESEARCH, AND ENVIRONMENT

HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

DECEMBER 8, 1982

1525 18th Street, N.W. Washington, DC 20036 ☎ 202•833•1484
OFFICES IN NEW YORK, NY (NATIONAL HEADQUARTERS), WASHINGTON, DC, BERKELEY, CA, DENVER, CO

On behalf of the Environmental Defense Fund, I am grateful for the opportunity to testify today before the Subcommittee on Natural Resources, Agriculture Research, and Environment concerning the July 26, 1982 hazardous waste landfill regulations. I am Linda E. Greer, scientist with the Toxic Chemicals Program of EDF. I have a masters' degree in Environmental Science and Engineering with a concentration in environmental chemistry and biology from the University of North Carolina at Chapel Hill. Before joining EDF, I worked as an air pollution engineer and, previous to that, as an aquatic pollution biologist.

The Environmental Defense Fund has closely monitored the implementation of the Resource Conservation and Recovery Act (RCRA) since 1976 and has been an active participant in most major RCRA litigation and rulemakings. In the fall of 1978, we (along with several other organizations) filed suit against EPA for not meeting the April 1978 statutory deadline for RCRA regulations. For the next four years, we worked to get out the full package of mandated regulations. The hazardous waste land disposal regulations, which are the subject of this hearing, are an important piece of the RCRA regulation package, covering a significant mode of hazardous waste disposal in this country. That they be adequate to protect human health and the environment from harmful exposure to hazardous waste is central to the effective implementation of RCRA.

I will testify today on four major problems with the hazardous waste landfill regulations. The issues I will address are: lack of regulation for air emission monitoring and control, lack of requirement to retrofit existing facilities with liners, lack of requirements to show financial capability to perform corrective action, and, finally, lack of requirement to clean up contamination which has migrated beyond the facility property boundary. There are other problems in the regulations which I will not discuss today, and, if the Subcommittee desires, I can provide a complete evaluation of the regulations for the record.

Before I begin this discussion, however, I would like to emphasize that EDF is in substantial agreement with several of the witnesses who appeared before this subcommittee last week. In their testimony, these witnesses stated that landfills are the least desirable method of disposing of hazardous wastes, and that steps must be taken to shift wastes out of landfills. This should be a top priority at EPA in the next year.

Moving wastes away from land disposal is of central importance to sound hazardous waste management policy. After land disposal has been fully minimized, there will still be a need for stringent and effective regulations to cover existing hazardous waste landfills and new landfills whose necessity has been adequately demonstrated. The July 26 regulations fall short of providing this strict and adequate protection.

I. AIR EMISSION MONITORING

EPA has failed to address either monitoring or control requirements for hazardous air emissions at land disposal facilities. The Agency justifies this serious omission with a statement that (1) there is less information and experience on the extent of the air pollution problem at these facilities than on surface or groundwater pollution problems, and (2) the problem is dependent upon the nature of the particular waste being placed at the facility.

This position on air emissions from hazardous waste facilities is in complete contradiction to the Agency's previous statements in the February 5, 1981 proposed land disposal regulations. In this proposal, the Agency stated that improperly designed facilities could cause significant air emissions and required ambient air monitoring and appropriate response if contamination was detected.

There is no new data which justifies a change in Agency position on the seriousness of the hazard that these practices can present or the feasibility of monitoring and controlling them. In fact, evidence generated by studies funded largely by EPA itself clearly support the ability and need to monitor and control air emissions from land dispoal facilities.

Theoretical studies (using mathematical models) have predicted that high levels of emissions will enter the air from these facilities. Monitoring studies which confirm these predictions have been performed at over 20 operating Superfund sites (abandoned or inactive land disposal facilities).

A study undertaken by EPA and the state of California, for example, showed total carbon loading over 10 times higher in downwind locations than upwind.[1] Levels exceeding those estimated to be safe were found for several chemicals including benzene, toluene, and xylene.[2] Other studies conducted at several vinyl chloride sludge disposal sites and a PCB waste disposal site also showed high levels of air emissions. Vinyl chloride levels up to 1,100 ppb were found at the site, with levels from 70 to 500 quite common. Levels over 30 times the level estimated to be safe (up to 370 ppb for vinyl chloride) were found in residential/public access areas close to the sites.[3] Concentrations of PCBs at the PCB waste site ranged from 5.9 to 540 ug/m^3, greatly exceeding those estimated to be safe.[4]

Most recently, EPA has completed a survey of air emissions from 15 off-site hazardous waste facilities. The study found 180 organic compounds in ambient air of facilities and also found toxic metals associated with the fugitive dust particulate at the site.[5]

A summary of the findings of other studies can be provided to this subcommittee if requested. It is clear from the literature, however, that there is sufficient information about all relevant aspects of the air emissions problem (extent of problem, sampling methodologies, control strategies) for EPA to take prompt regulatory action. Such action should consist of a requirment that facilities monitor their air emissions at a time of worst-case meteorologic conditions quarterly and respond appropriately to the detection of contamination.

II. LACK OF REQUIREMENT TO RETROFIT EXISTING FACILITIES WITH LINERS AND LEACHATE COLLECTION SYSTEMS

Without substantial justification, EPA has exempted existing portions of land disposal facilities (landfills, surface impoundments, and waste piles) from the containment design requirements of liners and leachate collection systems. By doing so, EPA abandons the notion of preventive action to control pollution from these potentially dangerous facilities and relies solely upon the groundwater protection and response (Subpart F) requirement to protect human health and the environment. The groundwater protection and response requirements consist of monitoring the groundwater upgradient and downgradient of the facility and taking appropriate corrective action measures when contamination is detected.

There are several significant problems with EPA's approach. First, protection of the public is entirely dependent upon the detection of contamination by groundwater monitoring systems. Although groundwater monitoring is an important part of the regulatory program, it is not fool proof, and our experience in installing groundwater monitoring systems is limited. In fact, by the Agency's own admission, stated in the 1981 Groundwater Research Plan, "major deficiencies [exist] in our capability to perform groundwater investigation." According to this document, such deficiencies are found in nearly every area necessary to effective groundwater monitoring: methods development, contaminant transport and fate, subsurface characterization, specific sources of contamination, and aquifer rehabilitation.[6] The Agency is by no means alone in its opinion that knowledge about groundwater and groundwater monitoring is relatively undeveloped. Similar opinions have been expressed in technical journals[7], editorials[8], and conference presentations[9] by many prestigious groundwater researchers and consultants. In fact, the groundwater expert Dr. David Miller, testifying before this subcommittee last week, stated that "compliance monitoring, with its dependence on predictions of contaminant migrations through the subsurface, may be beyond the current state of the art of groundwater science." He additionally indicated that he did not believe there was sufficient groundwater expertise at the state or national level to ensure adequate groundwater monitoring systems. This second point is backed up by a recent GAO report to the Congress on Federal/State Environmental Programs which states that states have difficulties in filling positions and retaining experienced personnel.[10] It is a mistake for EPA to design a regulatory program which places complete reliance on skills in technical areas in which the states are not well-prepared.

Second, performing corrective action response may be expensive and time-consuming, and it presents a host of technical problems of its own. Again, the corrective action requirement plays a necessary role in protecting the public, but it should be relied upon as a last resort, not as the sole means of protection.

EPA's justification for exempting existing facilities for liners and leachate collection systems is based on two easily refutable grounds. First, the Agency contends that the removal of waste necessary to install containment devices may result in the shutdown of production facilities because some land disposal facilities may be integral to manufacturing processes. This contention is based on no factual grounds and has several important defects:

1) It does not differentiate between facilites associated with manufacturing facilities and those which are not.

2) It completely ignores the fact that production facilities will not be uniformly affected by a retrofitting requirement.

Many manufacturing facilities have back-up impoundments, have space to construct new impoundments, or empty their impoundments to perform routine maintenance or dredging. In these instances, manufacturing processes will not be substantially affected by a retrofit requirement.

We are not aware of any data to support EPA's claim that manufacturing processes would be affected in many cases. Data collected by EDF during a survey of hazardous waste surface impoundments in Region II contradicts the Agency's contention. In this survey, we interviewed 53 facilities (one half of the surface impoundments in Region II, excluding Puerto Rico), and 24 responded. Our findings were:

° only 1 facility would shut down if its surface impoundment was taken out of service temporarily.

° 48% of the facilities had backup impoundments.

° of those without backup impoundments, 82% of the facilities had land to build one.

° 50% of the facilities without a backup impoundment had nevertheless emptied their impoundments in the past to do routine maintenance/dredging.

We realize that the conclusions which can be drawn from a survey of this size are quite limited. However, the results are extremely useful because they contradict a sweeping allegation made without any supporting data.

3) It fails to take into account the inherent flexibility of the permitting process in avoiding manufacturing shutdowns

through the use of compliance schedules.

4) It handles the prospect of temporary closures in a way which is inconsistent with other parts of the regulations. Although temporary closures may be necessary in selected cases, the Agency has recognized this necessity with respect to floodplain location standards (See 47 Fed. Reg. 32290-1) and substantial breaches of containment (See 47 Fed. Reg. 32320).

Second, the Agency contends that exhuming wastes may create significant hazards for workers. This contention ignores the ready availability and ease of operation of various excavation and dredging techniques.[11] It also ignores the fact that the danger posed by exhuming wastes depends upon a variety of factors, including the quantity and density of the waste to be exhumed.[12] Barely used trenches are appropriate candidates for retrofitting.

The sole criterion of Section 3004 of RCRA is protection of public health and the environment. EPA's approach to existing facilities fundamentally fails to meet this mandate.

The limitations of the Agency's approach to regulating existing facilities are especially troublesome in light of the tremendous hazards these facilities pose to human health and the environment. In addition, because the siting of new facilities is proceeding so slowly, the population of landfills we will be dealing with over the next 5 to 10 years will be predominated by existing facilities.

EDF proposes that retrofitting should be required for existing portions of facilities unless 1) site-specific considerations render the retrofitting option technologically infeasible using best available technology or 2) the process of retrofitting the facility would pose a greater risk to human health and the environment than not retrofitting (due to the danger of exhuming the waste). The burden would be on the applicant during the permitting process to prove a particular facility qualifies for the exemption. Should a facility qualify for the exemption, the permitting authority should then require containment devices which do not require retrofitting to discourage waste migration. These devices should be required unless the hydrogeology of the site and the existing design of the site provide equivalent protection against waste migration. Examples of such devices include subsurface leachate collection drains, slurry walls, and grout curtains. There are several important advantages to this approach:

1) Exemptions from containment requirements will be granted on the basis of proven site-specific technological and environmental constraints rather than unproven generalizations about the impact of retrofitting nationwide.

2) Retrofitting will be required where it can be done

safely, thus incorporating a preventative aspect to the regulation of existing facilities.

3) Where retrofitting is truly infeasible, other containment strategies can be employed where necessary.

III. THE IMPORTANCE OF FINANCIAL RESPONSIBILITY FOR CORRECTIVE ACTION

There is a significant gap in EPA's regulatory coverage of hazardous waste land disposal facilities. The Agency's regulatory scheme relies on corrective action by the owner/operator to protect human health and the environment, yet requires no financial assurances that the corrective action will be performed. Thus, whether corrective action will actually be performed is out of EPA's control, because it will largely depend upon the financial resources available to the owner/operator. In the present regulatory framework, actual protection of human health and the environment may not be achieved.

The lack of a mechanism to ensure the performance of corrective actions is a serious matter from both a legal and policy perspective. Legally, permitting standards for land disposal facilities must include such qualifications regarding financial responsibility as may be necessary to protect human health and the environment, pursuant to Section 3004(6) of RCRA. If corrective acton is the underpinning of the health and environmental protection afforded by the permitting standards, then requiring a facility owner/operator to prove its ability to actually perform a corrective action is necessary to protect human health and the environment, absent an alternative mechanism available to ensure performance.

As a policy matter, requiring evidence of financial responsibility for corrective action is important to discourage abandonment of facilities, assure full coverage of the costs of hazardous waste management, and provide incentives for better hazardous waste management.

The regulatory system should not allow or induce the further abandonment of problem waste sites. Abandonment (in either the voluntary or involuntary form) has already plagued the nation's ability to address the risks posed by facilities operating before the RCRA program took effect. The problem of identifying an owner/operator with sufficient assets to clean up these non-RCRA permitted waste sites is so considerable it prompted Congress to enact the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (most commonly known as Superfund). Yet by not requiring assurance for corrective action, the Agency even may encourage the abandonment of permitted sites.

Moreover, the Agency may be forced to accept substandard corrective actions at some point in the future because a proper corrective action would be so expensive as to result in abandonment, and thus in no corrective action at all.

Corrective action financial assurance requirements would help fill the large void in the financial responsibility area. For example, the Agency has required land dispoal facilties to obtain insurance or otherwise provide financial assurances to cover liabilities to third parties for non-sudden releases occurring during the active life of the facilities. Yet, nothing is required from the owner/operator to remedy releases while they are on-site, before the releases become a liability. Assurances that contamination, when discovered, will be addressed on-site will reduce the exposure of any insurer of third-party claims and should, in the long run, make such insurance easier and cheaper to obtain. Furthermore, to the extent the insurance industry is involved in providing corrective action financial assurances, opportunities would be provided to coordinate premium assessments, site inspections and loss management for both off-site and on-site responsibilities.

Requiring financial assurances for corrective action will also provide a worthwhile non-regulatory incentive to make good siting and design decisions. The requirement encourages an evaluation of the long-term consequences of siting the facility in a particular location. If the assurances are required at the time of permitting and are based on site-specific estimates, the owner/operator will be encouraged to consider the ease of performing and the future costs associated with corrective action in the facility's proposed hydrogeological setting. This is an important consideration since the regulations do not currently consider the ease and/or feasibility of corrective action as a location consideration in siting new facilities.

Financial responsibility for corrective action could be demonstrated by the same financial assurance mechanisms which may be used to demonstrate financial responsibility in other contexts. EDF has submitted extensive comments on the mechanisms available for making this demonstration in a joint filing of comments on the issue with a major insurance company. These comments can be provided for the record.

IV. DUTY TO CLEAN UP CONTAMINATION PAST THE COMPLIANCE POINT

EPA does not require cleanup beyond the waste boundary of a hazardous waste disposal facility. Their rationale is that "there is no guarantee that the owner or operator could obtain permission to enter neighboring property to conduct corrective action." 47 Fed. Reg. 32311 (July 26, 1982). Instead, EPA seeks to rely upon CERCLA and other authorities to address the off-site contamination.

This position is absurd and unlawful. First, under CERCLA or any other authority, the potential problem of obtaining off-site easements exists. Thus there is no distinction to be made between the permitting process and enforcement authorities. In the consent decree at Hyde Park, for example, defendant Hooker Chemicals and Plastic Corporation is required to use its best efforts to obtain rights of way, rights of entry, approvals, etc. to perform its off-site cleanup obligations.[13]

Second, it is difficult to imagine the owner of contaminated property not granting the necessary permission to have his property cleaned up by the entity which polluted it. EDF seriously questions whether the problem raised by EPA exists.

The repercussions of the Agency's folly, however, is not hypothetical. Under the current scheme, the Agency would be forced to duplicate its efforts in cleaning up contamination from one source because it would be required to institute two separate actions to address the on-site and off-site contamination. This represents an intolerable waste of resources, assuming both actions are actually undertaken. Significantly, resource constraints may prevent the Agency from addressing the off-site contamination in a timely fashion. In addition, by relying upon other authorities instead of the permitting process, EPA has knowingly shifted the burden of proving whether a risk to human health and the environment posed by the contamination exists from the applicant to the Agency and thus has made its task more difficult and time-consuming. It has also significantly altered the level at which cleanup action is warranted by relying solely upon the imminent and substantial endangerment language of the other authorities. In short, the Agency has crafted an unacceptably difficult methodology protecting the public from off-site contamination.

Releases from permitting sites pose their greatest risk to human health and the environment when they migrate off-site and are thus available to expose the nearby community. EPA has needlessly and irrationally abrogated tis authority to require the cleanup of these releases.

CONCLUSION

The issues of air emissions monitoring, standards for existing facilities, financial responsibility for corrective actions and duty to clean up past the comtamination point are not EDF's only concerns in the landfill regulations. These concerns are outlined in detail in our comments to the Agency and can be provided for the record. At the core of the issues I have not discussed is the following problem: EPA has proceeded as if their engineering designs are fail-proof and is in some areas trying not to find contamination. For example, where a double liner and a leachate collection/detection system has been installed, the Agency exempts a facility from groundwater monitoring requirements. The psychology of this approach is understandable - EPA would like to think that these regulations are based on infallible principles and sound science and will prevent any contamination. However, by their own admission in the preamble, these landfills will surely leak at some point in time. Since the Agency is charged with protecting human health and the environment, we feel they are obligated to take maximum measures to ensure that the waste is contained and, just as important, that they detect any waste that escapes containment.

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5. P.K. Ase. Air pollution sampling and monitoring at hazardous waste facilities. ITT Research Institute. unpublished draft, December 1981. 298 p.

6. Environmental Protection Agency. 1981. Ground Water Research Plan. September 1981. p. 10.

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11. EPA. 1981. Remedial Actions at Hazardous Waste Sites: Survey and Case Studies. EPA 600/2-81-246. September 1981. 230 p.

12. EPA. 1982. Handbook Remedial Action at Waste Disposal Sites. EPA-615/6-82-006 - June 1982. 497 p.

13. See section 8(d) of the Stipulation and Judgment Approving Settlement filed in U.S. v. Hooker Chemical and Plastics Corp., Civ. Act. No. 79-989 (W.D.N.Y.), filed January 19, 1981.

Mr. BROWN. Thank you very much, Ms. Greer.

We would like to receive the reports and documents that you referred to in your statement, if you could do that. We will make them an appendix of the final printed record.

Mrs. Schneider.

Mrs. SCHNEIDER. I have a whole series of questions. I would like to begin with Mr. Goldberg.

One of the things I was interested in is that the EPA regulations don't require ground water monitoring if these facilities have a double liner. You criticized this because of the inadequacies of the liners. I was wondering if you might give this Congress some direction as to how you would recommend we address this point of controversy in the regulations.

Mr. GOLDBERG. I think I did that in my comments. Just to reiterate, I would simply require the ground water monitoring whether they have a single liner, double liner, quadruple liner, or anything that comes up in the future.

The point that was made by myself and Ms. Greer is that I think it is critical to have an idea of what is coming through the liners and, if there is something, we should know about it. It is apparently, as I said in my testimony, an attempt to use economic incentives to fashion regulatory responses. I think that may well be an admirable theoretical thing for EPA to want to explore. I know that there has been a lot of discussion in the past about taxes on air pollution and whether we can use that as a method for regulating air pollution, and that is fine. Let's explore those alternatives and see whether that may be more cost-effective, and so on.

But what I would point out is before we have the answers to whether those things work, let's start on a program which is not so critical to the well-being of the health of the Nation as the most critical program, the hazardous waste program. It just seems like an ill-founded place to begin the experiment.

Mrs. SCHNEIDER. In reference to your discussion about Port Washington, what about some of the joining communities? Have they been forewarned about the difficulties with the water pollution there? Is there some kind of mechanism or local program for notification?

Mr. GOLDBERG. The water district is a part of Port Washington; Port Washington is a part of the town of North Hempstead; the town of North Hempstead is a part of Nassau County. So, when Nassau came out with their report showing there is indeed vinyl chloride in neighborhood air, certainly everybody who reads Newsday, and so on, was forewarned. We have been telling the press, and so on, of the problems.

In terms of the ground water, Nassau County still maintains that there has not been a breach of the liner, in spite of the trace—to us, the smoking pistol is there. You have organic chemicals which are very strange being found in the ground water wells, and you have the same organic chemicals being found in the leachate. To us, it doesn't take too much to put two and two together and to conclude that indeed there has been a breach of the liner.

The point that Nassau County then makes and that the town makes is, "Well if there has been a breach in the lining, because of ground water flow, it will not go toward the water wells, it will go toward the bay and people won't be drinking the water." That is right. There is a beach right there and people will be swimming in it.

Mrs. **Schneider.** Are you aware of any kind of health analysis or survey that is being conducted as to the current health status of people living in the community, and is there any effort to do any tracking?

Mr. **Goldberg.** We have requested such health analysis by the Nassau County Health Department for several years now, and we had been getting nowhere whatsoever in getting them to come out and start doing the surveys. With this latest effort, the latest disclosure by EPA itself that indeed there is vinyl chloride, confirmed readings of vinyl chloride, in the neighborhood, at the last public meeting, which was December 30, it seemed as if there may be some movement on the part of the Nassau County Health Department toward agreeing to perhaps do some of that type of epidemiological analysis. However, there has been no assurance given that they will do it.

Mrs. **Schneider.** How long have we been waiting now for some kind of health analysis to be conducted?

Mr. **Goldberg.** Well, it would have been nice if 8 years ago when they made assurances that there would be no problems whatsoever, that before the landfill went in, they would have done a background health analysis to make sure that there are no problems.

We have had people who live right along the landfill die of cancer. The most recent person died of cancer about a week and a half ago—actually, it was on Thanksgiving Day—who lives approximately 1,000 feet from the landfill. Necessarily, there is no conclusion that that was a result of the landfill, one person in four in the United States dies of cancer, but, nevertheless, until you do a statistical analysis to find out whether there is unusual numbers of cancer in the neighborhood, nobody knows.

Mrs. **Schneider.** It looks like we are losing our opportunity to do that kind of case study because there is no health analysis being conducted.

Mr. **Goldberg.** That is right.

Mrs. **Schneider.** Ms. Greer, I was wondering if we followed all of the recommendations that you made in your testimony and required EPA to make those alterations, would the Environmental

Defense Fund then accept the landfill disposal process as an accepted means of handling and managing hazardous wastes?

Ms. GREER. The easy answer to that is "No." I think that the single most important thing that has to be done is to ban substances from landfills and ban landfills altogether, to the extent that that is feasible. We regard the regulations as regulations which are governing an evil, a necessary evil in the case of existing facilities for right now, and an evil that is necessary for those landfills whose need has been adequately demonstrated.

But the only responsible thing to do in terms of landfilling hazardous waste is to ban high-priority substances from landfills and shift wastes to more environmentally sound alternatives.

Mrs. SCHNEIDER. How economically feasible is that? Do we have any case studies that we can point to where those procedures are being taken voluntarily?

Ms. GREER. The procedure to point to is the one that has been done in California, where they have systematically identified high-priority wastes to take out of landfills and have developed a schedule for shifting those wastes to environmentally accepted alternatives. As has been discussed last week in testimony and here again today, that does provide a national model for what could be done.

Mrs. SCHNEIDER. As we all know, EPA's hazardous waste landfill regulations are 4 years behind schedule and, needless to say, based on the testimony here today and the testimony we received in the hearing last week, there has been a great deal of criticism about those regulations. Finally, they are here, and you would think we would welcome them with open arms. However, I am just curious to know what some members of the panel think of why it took EPA so long initially in these regulations and what does this actually say about how the agency operates?

Mr. NOSENCHUCK. If I might be permitted to give my opinions on that, EPA and the people who have been involved with the programs at EPA have not been working with the States, even back, I would say, the last 4 years, for whatever reasons. I have been in the solid waste program since the beginning of January of 1979. I have found a reluctance on the part of even the professionals in EPA, along with their leaders, under two administrations, previous and current, to rely on the States for their expertise and have the States be equal partners in developing the regulations.

EPA calls into effect one of their existing laws that says that States cannot participate, and that is part of the problem. EPA doesn't have the knowledge. They are relying on outside contractors that are giving EPA information that EPA, in effect, wants them to to develop for a particular purpose, and it doesn't mean it is actually correct information. EPA has made a mistake in the whole area of not involving the States as full and equal partners in developing regulations and then telling the States, "Fellows, you got it."

Mrs. SCHNEIDER. Yes.

Mr. NOSENCHUCK. We are not going to accept it. Whatever EPA does in this area as minimum requirements are interesting. We are going to take care of the interests of the people in our State ourselves.

Mrs. SCHNEIDER. What do you think have been EPA's primary considerations in devising these regulations?

Mr. NOSENCHUCK. It is very difficult for me to say. Certainly, I think that they are trying, to a certain extent, to put something in place that is going to be workable. I think they are subject to an awful lot of lobbying pressure, and I think that is what we see reflected.

Mrs. SCHNEIDER. It is interesting that you should bring that point up again. I would say that, insofar as hazardous waste, I have very few complaints personally about EPA. But I think that the reason for that is because I have been pummeling them.

We in the State of Rhode Island have 3 of the most dangerous hazardous waste sites of the 114 that have been designated, but our State has had good cooperation from the Environmental Protection Agency. I think, in all modesty, it may have something to do with the fact that there are a whole lot of people in office and outside of office that are working collectively and laying the pressure on the agency. I submit that that kind of pressure probably would get results for others, too. We need that kind of heavy cooperation.

Mr. GOLDBERG. I would certainly echo your comments. The only reason we got EPA involved in our situation was through intense pressure and going to our Congressmen and U.S. Senators.

Mrs. SCHNEIDER. Yes.

Mr. STODDARD. I think I would like to add that the EPA program lacks an essential ingredient which is commonsense and what do you do to prevent problems from occurring. I just don't think we have seen that reflected in the program. I think that part of that is that the EPA does not go out and do enough consultation with State departments, with people who live around dump sites and the concerned public so that the regulations appropriately reflect the concerns of the people of this country. We are shooting at regulations that we often see for the first time and which we don't feel are responsive to the problems. The EPA has to do a better job of identifying the problems and developing strategies that are responsive to those problems.

Mrs. SCHNEIDER. So what you are suggesting is that these proposals and decisions are being made at EPA in isolation and perhaps what the agency or bureaucracy should be more involved in is doing what we Members of Congress do, and that is get back to the grassroots and feel and live the problem.

Mr. STODDARD. Exactly. That is right.

Mrs. SCHNEIDER. Thank you.

Thank you, Mr. Brown.

Mr. BROWN. Thank you, Mrs. Schneider.

Let me just raise one question here, and then I want to recognize our staff consultant to ask some questions. I have a well-known and longstanding bias about the importance of improving the R&D and monitoring activities of EPA. I want to get on the record from any of you who care to comment whether or not you feel that we need to give additional emphasis in these two areas which, in this situation, are really closely related because the monitoring program is indispensable to the R&D program and vice versa. But I am concerned about the adequacy of the pollutant monitoring itself, both air and water. The health monitoring which, generally speaking, you two gentlemen representing the States, your experience seems to be that it is not within the jurisdiction of the waste management people, but rather the health people. But it needs to be connected very closely, it seems to me.

The EPA, of course, has justified their regulations, in part at least, on the basis that they have a lack of knowledge to enable them to regulate more stringently on some of these areas. Sometimes I am willing to give EPA the benefit of the doubt with regard to whether they are justified in what I would consider overly lenient regulations, but I don't want them 5 years from now to come back and say, "We still don't have enough information to regulate stringently."

If we can correct that situation, if the situation is one where the application of modest resources in R&D would give us the knowledge base required to regulate, including the economics of the regulation, I want us to start getting that information so I don't have to come back 5 years from now—which, believe me, I have done now over several 5-year periods, and I don't like it.

So I would like to have your comments on any inadequacies or corrective measures that you think might be useful in this particular area.

Mr. GOLDBERG. Congressman, if you don't look for a problem, you don't find it. Just like in some of the environmental laws, there was technology-forcing regulations that Congress has put in, such as the best available technology, and so on. EPA apparently for a long time just didn't look for air pollution problems with regard to these things.

When we talked about air pollution problems at Port Washington, that there might be vinyl chloride there, people said we were crazy. There was a reading by the Nassau County Health Department and everybody assumed that was from some household chemical or something. We came out with a report and said that, at the very least, we should go back and find out whether or not that reading was a specious reading. For 1 year, they didn't bother to go back and look at it. When they did finally get forced to go back and look at it, largely because of Mike Wallace and "60 Minutes," they found confirmed readings of vinyl chloride.

So it seems to me that your point is absolutely well taken. You have got to get these people to start looking to see whether there are problems, not just assume that they don't exist. If that requires that the Congress tell the EPA to go out there—and I assume appropriate the sufficient money—and look at whether there are air pollution problems with regard to some of these sites, then that needs to be done. I think it is unconscionable that they have taken this long, since RCRA, to think about that aspect, but apparently that is the case.

Mr. NOSENCHUCK. I would like to add also that it is our opinion that additional research and development is needed in this area, and that R&D effort is quite properly the responsibility of the Federal Government. Standards are still needed.

You read in the press about the dioxin problem or the contaminated soils in different States like Missouri, the 133,000 parts per million of PCB-laden soils in Arkansas, and somebody trying to equate that with candy bars or something like that. There is a real problem. This is a responsibility of EPA to do this work. They should develop the standards and make this information available to the States. They should not expect the States to do this R&D work on what is essentially a national problem.

Ms. **Greer**. I would like to add there really are two cornerstones to the protection provided in the regulations. One is the containment provisions for liners, and the next is the ground water monitoring. The whole thing revolves around those two issues.

EPA, in their preamble, states over and over again their lack of information on these issues and their lack of ability to proceed. I think that is an excuse for weaker regulations, because they truly don't know what they need to do. And I think that is inexcusable to not have that schedule for research at this point in time.

Another important point brought out by Mrs. Schneider is the health effects. EPA is not doing much to monitor health effects at all. In fact, one of our bones of contention with the agency right now is that they have not set up the health registry which is required under the Superfund law to be documenting health effects at existing problem hazardous waste sites.

So I think there are significant areas of no attention at all being given by the Agency, and we will not be able to improve these regulations without that information.

Mr. **Stoddard**. I would like to add, Mr. Brown, that the state of our knowledge about the long-term effects of toxic chemicals, particularly in the environment, is pitiful. We know very, very little. One of the reasons why there is so much controversy surrounding our regulations, both at the State and Federal levels, is because there is so much uncertainty, that we being forced to regulate in the face of tremendous scientific uncertainty. Unless we make a serious effort to begin to get better information on toxic chemicals and about their fate in the environment, this is going to go on forever. It is needless. I think we have to make a commitment to better research and development on long-term effects of toxic chemicals and on technologies to get ourselves out of this bind of having to regulate in the face of such uncertainty.

Mr. **Goldberg**. I would just add to what everybody has said. Even granting that there is much need for additional research and development, I don't think that allows EPA to say, "Well, therefore, we can't come out with a strong regulation." They cannot simply hide the problem by saying the information is not yet in. I heard that from EPA on acid rain. I hear it every single day from EPA when I read the newspaper. I just don't think, in this area in particular, that we can afford to play that kind of a game.

Mr. **Brown**. I would like to recognize our committee consultant.

Mr. **Burby**. I would like to ask Mr. Nosenchuck a couple of questions.

In your testimony you mentioned, and this is a quote: "If additional funding is received, the Department of Environmental Conservation intends to develop regulations to ban the landfilling of certain wastes." I would be interested in what kinds of wastes you are talking about and if they are in line with the California plan, such as cyanide or halogenated organics. Which specific wastes are you talking about?

Mr. **Nosenchuck**. I would like to state that we are very familiar with what California is doing. As a matter of fact, it wasn't too long ago that Kent Stoddard and myself met in New York to review his program and our program.

Here, if I might be permitted to read it, are the types of wastes that we are specifically talking about:

> Hazardous wastes which possess any one of the following characteristics should be prohibited from being land buried in chemical waste landfills:
>
> No wastes with a flash point of less than 80° Fahrenheit are permitted. No wastes or waste mixture that possesses a National Fire Protection Association [NFPA] reactivity hazardous rating of 3 shall be placed or created in the chemical waste landfill. Waste materials containing radioactive isotopes, explosives, shock sentive or pyrophoric substances are not permitted. Wastes that are known to possess a chemical or physical chemical ability to penetrate the clay and synthetic membrane liners used at a particular facility and those waste that, when combined, are known going to produce a mixture with this property are prohibited. Hazardous wastes other than high dilute spill cleanup debris which contain any of the organics substances listed in 40 CFR 261.33(e) are to be prohibited from being landfilled. And no wastes from which natural biological activity may create chemical products other than methane having an NFPA flammability hazard rating of 3 or greater are permitted.

Those are the types of wastes that we are talking about.

Mr. **Burby**. Would I be correct in assuming that you would support a national plan to begin to ban those kinds of wastes from land disposal facilities?

Mr. **Nosenchuck**. Not only would I support it, but I would request it. I would demand it.

Mr. **Burby**. Thank you.

Mr. Stoddard, I have a question for you. You mentioned in your testimony that the additional treatment costs would have a minimal effect on California industries. I would be interested in to what extent California industry has supported the initiatives you have taken in this area.

Mr. **Stoddard**. That is an interesting question.

It is hard for us to determine. We have on record strong support from generators and producers, disposal companies, for our regulations for the need to ban land disposal. However, at this point, I would say many of our largest generators of hazardous waste have fallen short of completely embracing California's programs. Specifically, waste materials that we are proposing to ban, the primary area of debate is on halogenated organics and whether or not California should ban the land disposal of all halogenated organics and throw the burden back on industry to document that their specific waste material could be safely deposited in a landfill.

Strong support from waste disposal companies, waste processors, I would say feints praise from most large generators in California right now, specifically on the regulations.

Mr. **Burby**. One other question, Mr. Stoddard. Last week, our representative from the National Solid Waste Management Association came in and said that he supported your initiatives, your plan, but the one part that he had a problem with was that you are giving an eventual 2- or 3-year phaseout for these wastes, and he thinks if they are toxic, persistent, and dangerous now, they should be banned now. I would like you to react to that.

Mr. **Stoddard**. We are on a 2-year schedule to phase out land disposal of the waste materials that I discussed earlier. Our preference would be to ban them tomorrow, because we believe they should not be disposed on land disposal facilities. The big dilemma that we face is what is going to happen to these wastes and what is the likelihood that they will be handled in a way that may present even greater dangers to the public and to the environment when they are stored for long periods of time or they are disposed illegally.

So, we felt we had to take the position that we have to have a good, safe alternative, and moving in the absence of an alternative might cause greater harm than good. But clearly this is an area we are very uncomfortable with. We feel very strongly these materials never should have been allowed to go to land disposal facilities. So we want to move even faster than the schedule if that is possible. As soon as we have an alternative, we want to follow it with the restric[illegible] land disposal.

Mr. [illegible] Would California be thinking about requiring hazardous waste land disposal owners and operators to dig these wastes up after they are eventually banned?

Mr. **Stoddard**. I think we would only do that if we were confident that we had a serious environmental problem.

I think one thing that is ironic is that California is known really for having some of the best land disposal facilities in the entire country. Our geology, for the most part, is very good for land disposal. Our climate is real good. We have had a lot fewer problems with our land disposal facilities.

What we are really concerned about is the long-term future. I think our approach would be to very closely monitor existing facilities, and if we find a problem, move in with our State Superfund or other legal remedies to clean up that site and to essentially turn off the tap as quickly as we can.

Mr. **Burby**. I have one more question for all of the panelists. Based on the testimony the subcommittee has received, both last Tuesday and today, I am going to make a characterization and I want you to agree or disagree with it. That is, in the long term, it would appear that the best solution to the hazardous waste problem is to cleanup existing disposal sites and to reduce or eliminate the generation of new hazardous wastes. Would you all agree or disagree, yes or no?

Ms. **Greer**. Yes.

Mr. **Goldberg**. Yes.

Mr. **Stoddard**. Yes.

Mr. **Nosenchuck**. An unqualified yes.

Mr. **Burby**. The second part to this question is: Do you believe these regulations, as they stand right now, provide adequate incentives for the development of alternative treatment technologies such as incineration and detoxification, and do you think this an appropriate thing for regulations to do? I would like all four of you to respond, please.

Mr. **Stoddard**. To the first part of your question, absolutely not. They don't provide the necessary incentives or framework to accomplish the increased treatment, recycling, destruction of wastes. It is absolutely vital that they do. If we are going to avoid some enormous expenditures, some incredible human suffering in communities all over the country, we have to move immediately to begin go reduce what we put into land disposal facilities.

Mr. NOSENCHUCK. For New York, the regulations do not meet the criteria that you just spoke about. The regulations do not move anybody into other methods for destruction or detoxification. It is unfortunate.

Again, I submit that what is needed is a move away from dependence upon the land. Actually what is really needed is an effort to reduce the amount of hazardous waste that must even be managed. But there is also a clear need to move into other methods of high technology which is in existence right now. Anybody who is permitted to put into place a secure chemical land burial facility should develop something similar to what we have in New York State, those 10-year high-technology plans.

I would be very pleased, if the committee would so desire, to submit for the record some of the ones we have received already in New York State.

Mr. BROWN. We would like to have those if you would submit them.

[See appendix, p. 435.]

Ms. GREER. I agree that these don't even come close to what we need to focusing waste out of landfills.

In some ways, if there were more stringent, they would make landfills more costly, and that would provide some mechanism. But I think what really needs to be done is kind of an independent—on EPA's behalf—initiative to ban wastes, kind of in the model of California where they decided what they wanted to do and proceeded with their proposal to ban specific wastes from landfills.

I think we have two needs. We have need for a set of regulations to control those landfills which are existing landfills whose needs have been adequately demonstrated; and we have a second, in fact, larger need to get wastes out of landfills. So I fault the regulations for what they don't contain, but I think that EPA can proceed independently to start this project of getting wastes out of landfills in the first place and then still have at their disposal the regulations which must be used for those unfortunate landfills which still exist.

Mr. GOLDBERG. I would agree with the other three panelists. I would also in reference to your second question as to whether it is an appropriate role for regulations to address that it certainly is, given RCRA itself. RCRA, I think, in its purpose section makes it very, very clear that EPA is to try to solve this problem in the broadest sense and in the most efficient long-term sense possible. Given that, I don't think it is beyond EPA's statutory authority, whatsoever, to go forward and to start looking at source reduction, to start looking at recycling and to start looking at destruction of these dangerous chemicals.

So I don't think perhaps any additional legislation is necessary. If EPA had wanted to, they could have gone foward with this set of regulations that required just what we are talking about today. They have not chose to do so.

Mr. BROWN. Ms. Back, do you have some questions?

Ms. BACH. Yes, I do, Mr. Brown.

I am going to followup on Mr. Burby's line of questioning and ask for all of you to respond. When we asked all of the people to come forth to testify, we asked them to speak about land disposal, and time and again we have been hearing not so much criticism about the actual regulations that came out, but the emphasis on land disposal and the dependency on land disposal.

Therefore, I would like your opinion as to why has EPA chosen this emphasis as opposed to alternatives? I would like each of you to respond.

Mr. Goldberg. First of all, I don't think that you can characterize our testimony as saying its highlight is on only the question: What is the appropriate role of hazardous waste technology? I think that we have gone into sufficient detail into the problems of the land disposal proposals that EPA has come out with.

As to the question of what was on EPA's mind when they came through this, I don't see how we can fairly be asked that question. I don't know what is on Anne Gorsuch's mind. I wish I did. Maybe if I did, I would have a better way of dealing with her in Congress.

Mr. Nosenchuck. Again, who knows why they did it? They certainly weren't listening to the States. We had asked to be full partners in the development of regulations. We were not given that opportunity. It is unfortunate.

Ms. Greer. It is interesting to look at it historically. There have been two other sets of proposed landfill regulations over the past 4 years. Keep in mind the fact that EPA was under a court-order deadline to get out these regulations. These regulations were historically very complex, they dealt with a very complex issue. There is an actual tendency to leave those things up until last, and that is what the Agency has done. When you look at the other regulations which are provided under RCRA, this was kind of the final major piece and dealt with a very major concern of the majority of the hazardous waste disposal facilities. I think, given that context, what they did was the best they could do.

You also have to remember that there was another administration that came in and, when you look at what they did when they first came in, there was an actual effort to unravel some of the regulations which were on the books in the first place.

So I think it is important not to kind of lose perspective on the pressures on the Agency, both political pressures and technical pressures, to come up with a set of regulations under a court-ordered deadline.

Ms. Bach. The second question is that we have heard that the Agency does not feel that it is their position to encourage the marketplace to invest in alternative technologies, that that is really not their responsibility. What, in your opinion, is the ability of the marketplace to invest in these alternatives, and how should it be encouraged?

Mr. Goldberg. I just have a question in that area. If they are saying to you—I haven't heard this before that it is not their responsibility to encourage the marketplace to do something—then why have they written into their regulations the double liner monitoring thing? That clearly is trying to use market mechanisms to get regulatory results. They can't be saying one thing one place and something somewhere else. If they don't believe in using markets to encourage regulation, then why do they have the double liner monitoring tradeoff?

Ms. Bach. I wish I could answer your question, Mr. Goldberg.

Mr. GOLDBERG. I would have loved to have heard Rita Lavelle this morning tell us the answer to that one.

Mr. STODDARD. It is absolutely inappropriate to try to use the marketplace as the sole mechanism of protecting public health. I mean their primary responsibility is to protect the public and the environment from hazardous wastes. To continue to put waste materials, highly toxic waste materials, in landfills just doesn't cut it. I don't know why they choose to rely on the market in this case when clearly regulations are needed.

Now, if we want to go further and say we would really like to see all hazardous wastes ultimately eliminated from land disposal facilities, even though we can't document that there is a serious potential human health problem, fine, let's use some incentives and let the market get us to that ultimate goal. But right now we have a very serious health problem. It takes regulations, not monkeying around with the market to try to provide that level of protection.

Ms. GREER. In fact, I would argue that they are playing around with the market, because what they have done is allowed landfilling to be so artificially cheap. That is the cheapest alternative. But when you look at the long-term costs of when these facilities leak, et cetera, they are not having to incorporate those kinds of costs into the price that you actually pay for landfilling.

So I would argue that they are playing a marketplace game, even though they are not admitting it, but they are just playing it all wrong. They are focusing wastes into landfills on the basis of economics rather than out.

Mr. NOSENCHUCK. I would like to state that if we are going to depend on the marketplace, then all we have to do is look at the whole purpose of the Superfund legislation, Public Law 96-510. Even by EPA's admission, there are over 13,000 hazardous waste sites, and I submit one heck of a lot more than that, actually available. So we have inherited the problems that we are faced with under Superfund, the problems of the past, because we did depend on the marketplace.

Is EPA saying that we should not even have regulatory agencies at all? I think that is a mistake. In New York State, when we strive ahead to move into high technology, the comments of the business community is always along these lines: Why are you leading in this area? Let's depend upon what the Feds, EPA, has come out with. If it is good enough at the national level, it should be good enough here.

When EPA comes out with their weak regulations that don't meet the needs of the people and the environment, it makes it very difficult for us in New York State to move ahead with what we want to put into place.

Ms. BACH. Thank you Mr. Nosenchuck. Thank you, Mr. Chairman.

Mr. BROWN. Mr. Burby?

Mr. BURBY. I just want to read this into the record. This is a May 29, 1982, National Journal article. Rita Lavelle, Assistant Administrator, Office of Solid Waste and Emergency Response, USEPA, was questioned about Congressman Florio's concern that the current regulations—and here we are talking about the RCRA because, as you know, the July 26, 1982, land disposal regulations had not come out at that time—act as economic disincentives to the shift of hazardous waste disposal practices towards alternative treatment technologies, stated:

> It is not the responsibility of the regulatory agencies to create or change economic incentives. We have to leave the marketplace alone. I am not worried about the chemical companies or the disposal industry.

There is more.

Mr. **Brown**. There is lots more, of course.

I want to thank all of the witnesses for their excellent testimony this morning. I think that we have established a very clear picture of the situation and, hopefully, the needs required in the future. I know the chairman is still hopeful that Ms. Lavelle will submit her testimony and can be called as a witness sometime in the near future. But circumstances will determine that.

So, for the present, the subcommittee will stand adjourned. Thank you.

[Whereupon, at 12:31 p.m., the subcommittee was adjourned.]

EPA'S REGULATIONS FOR LAND DISPOSAL OF HAZARDOUS WASTES

WEDNESDAY, DECEMBER 16, 1982

House of Representatives,
Committee on Science and Technology,
Subcommittee on Natural Resources, Agriculture
Research and Environment,
Washington, D.C.

The subcommittee met, pursuant to call, at 10 a.m. in room 2318, Rayburn House Office Building, Hon. James H. Scheuer (chairman) presiding.

Mr. Scheuer. The Subcommittee on Natural Resources, Agriculture Research and Environment will come to order.

Today we will continue our examination of EPA's regulations for land disposal of hazardous wastes.

Specifically, the subcommittee plans to continue its evaluation of the scientific basis of EPA's ground water protection strategy in addition to receiving an update on the Agency's plan to ban land disposal of highly toxic and persistent hazardous wastes.

Past hazardous waste land disposal practices have resulted in serious harm to public health and the environment. It is the responsibility of this subcommittee, therefore, to insure these regulations adequately safeguard the health of American citizens and the environment in which we all live.

In the past 2 weeks, we have heard from representatives of the scientific, industrial, and environmental communities, as well as State governments, and they have informed this subcommittee that it is urgent we reduce our dependence on land disposal by utilizing alternative existing technologies such as incineration and detoxification.

Today we will hear the administration's position on the recommendations of our previous witnesses and EPA's scientific and technical basis for the regulations. Representing the administration is Ms. Rita Lavelle, EPA's Assistant Administrator for the Office of Solid Waste and Emergency Response.

Before turning to my colleague, Mrs. Schneider, for her opening remarks, I want to express my concern to you, Ms. Lavelle, over your failure to cooperate with the committee in prompt submission of your testimony. We wrote you on October 27 inviting you to testify before us on December 8, 5 weeks before our scheduled hearing. In the letter of invitation, we requested 25 copies of your testimony 3 days in advance of your testimony, as is the age-old historic practice here on Capitol Hill—nothing new, nothing different.

As of 5 o'clock of the evening before you were supposed to testify here the following morning, we hadn't received your testimony. We weren't even advised as of 5 o'clock whether we could expect a written statement.

If we are to do a proper job of oversight, if we are to fulfill our constitutional duty of scrutinizing the work of the executive branch in conducting proper oversight, we have to be able to do our homework. We have to be able to do it as a courtesy to you, not to simply "wing it" when you come here with no idea of what you are going to say, but we have to be able to think about what you are going to say and ask you appropriate questions. We may even want to do some research on what you say, and we have 3 days to do it. That is the purpose of asking you to get your testimony up here 3 days in advance.

You are not the first official from the EPA who has come to us testimony in hand, giving us your testimony a few moments before you start to speak. That doesn't enable us to do you the honor and to do you the courtesy of having thought about your testimony before you show up here, and it doesn't permit us to do right by our constitutional obligation to conduct oversight.

I don't wish to get into any further controversy. I do wish to send a message to you and to the EPA that we will in the future cancel hearings if we don't get testimony in a timely fashion as we didn't get with you. It causes a great deal of trouble with staff in scheduling repeated hearings because your testimony wasn't up here. You are a busy person, we are busy people, and we ought to be able to conduct our business in an expeditious fashion and serve the public interest as best we can. And that does mean for you and for some of your associates at top levels of EPA to give a little more attention to our requests, which are time-honored in other branches of the Government, to have your testimony up here in a timely fashion, 3 days before the start of the hearing.

Having said that, I would now like to turn to Congresswoman Claudine Schneider, of Rhode Island, one of our most hard-working and thoughtful members.

Mrs. SCHNEIDER. Thank you, Mr. Chairman.

I would appreciate the opportunity for unanimous consent to include my statement in the record so, in the interest of time, we can get on with the testimony and then the questioning. May I have your agreement that I can include my statement in the record?

Mr. SCHEUER. Of course.

Mrs. SCHNEIDER. Thank you.

[No statement was submitted.]

Mr. SCHEUER. Ms. Lavelle, would you care, for the record, to introduce your two colleagues with you at the witness table?

Ms. LAVELLE. I would be happy to do that, Mr. Chairman.

To my immediate right is Dr. John Skinner, Director of the Office of Solid Waste, specifically the Director of the RCRA program for the Agency; and to my left is Mr. Jack Lehman, Director of the Hazardous and Industrial Waste Division in the Office of Solid Waste.

Mr. Chairman, your comments are noted, and I will assure the staff that our testimony will be up here in a timely fashion. I do apologize.

Mr. SCHEUER. We appreciate that very much. I hope you will note that my remarks are more in sorrow than in anger, and we hope very much that we won't have to make remarks of this kind in the future.

If you will please rise and raise your right hands.

[Witnesses sworn.]

Mr. SCHEUER. Thank you very much. You may be seated. You may consider yourselves under oath.

Ms. Lavelle, take your time. We are all here in the family. Why don't you just give us the high points of your testimony, as I say, in 8 or 10 or 12 minutes, and then I am sure we will have some questions for you.

TESTIMONY OF RITA LAVELLE, ASSISTANT ADMINISTRATOR, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, U.S. ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY DR. JOHN SKINNER, DIRECTOR, OFFICE OF SOLID WASTE, U.S. ENVIRONMENTAL PROTECTION AGENCY; AND JOHN LEHMAN, DIRECTOR, HAZARDOUS AND INDUSTRIAL WASTE DIVISION, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. LAVELLE. I would be happy to do that, Mr. Chairman.

Mr. Chairman, it is a particular pleasure to appear before this committee. I personally believe that good science must be the basis for our Nation's hazardous waste program management. Therefore, it is really a particular pleasure to have the opportunity to discuss with the chairman in a committee which is dedicated to the same principles of sound scientific practices.

I will summarize my remarks for the Chair and try to keep them to about 10 minutes. I look forward to the questions.

RCRA was enacted, as members of this committee know very well, in October of 1976. It required EPA within 18 months to develop and publish criteria, a list of hazardous wastes, and regulations for operators of hazardous waste facilities. Unfortunately, nothing was promulgated until late 1980 and early 1981, 4 years after Congress expressed its intent.

From the moment this administration took over, it was clear that one of our major tasks was organizing the regulatory approach into a meaningful approach, one that would be protective of human health and the environment. We would have to complete publication of the regulations and insure that these regulations are complied with.

A review of the existing data when we came on board indicated very clearly one fact: More than 90 percent of the hazardous waste generated in this country was disposed in and on the land. Thus, we put our resources into development of regulations insuring that the practices followed were protective of human health and the environment.

I am proud to report today that we published our regulations in July of 1982. We have, we feel, one of the most comprehensive set of regulations in EPA history. They are well thought out, and they are based on the best available data—in short, based on very good science. We have a total package. It regulates construction, performance, closure and post-closure, as well as directing management criteria for financial responsibility and accountability.

The technical information base that supports the promulgated regulations is quite substantial, but by no means complete. We have expended since 1980 about $15 million in hazardous waste land disposal related research. In addition, previous work on land disposal of municipal refuse also formed part of the information we used in developing these rules. Some 29 projects have been conducted or are currently underway to investigate necessary requirements for covers, liners, pretreatment processes, as well as other design and operation aspects of land disposal units. This work has included broad studies, such as investigation of the appropriate design and construction of covers for landfills, as well as more specific research. For example, one ongoing project relates to the necessary soil bedding requirements for flexible membrane liners.

In addition to work focusing on design and operation of land disposal units, 19 additional projects—totaling about $3.2 million to date—have evaluated how pollutants migrate when and if they get out of the engineered facility. Significant work has also been focused—in fact, seven specific projects—on available technology for ground water monitoring. And in conjunction with efforts to support Superfund cleanup activities, much effort has been expended in developing and evaluating remedial technologies.

Our technical approach with these regulations is dual. It is one of prevention and one of immediate reaction. Coupled with strong management protocols, we feel that this approach is one that will do the job.

The liquids management program implemented by the D&O standards is the first line of defense in what I refer to as the prevention side of the regulation. It has three major goals. One is to keep liquids out of the facility to the extent possible and practical and, thereby, minimizing leachate formation. The regulations contain rules for run-on control, as well as requiring that closed facilities be covered with low-permeable caps to minimize infiltration and precipitation in the future.

Second, the D&O standards attempt to prevent leachate migration to the extent possible. During the operating life, this is accomplished by the use of liners that act as a barrier to the escape of liquids from the facility. We also require run-on controls as well as run-off controls for most types of facilities to prevent contamination of surface waters and surrounding soil areas. For surface impoundments, we have included rules to prevent overflow or overtopping of dikes.

Third, the D&O standards require removal of leachate formed during operation so that it will not be available for migration after closure. This is accomplished by a leachate collection system for piles and for landfills. For surface impoundment, the waste must be removed or solidified at closure, thus eliminating liquids at that time.

The ground water monitoring and response program is a backup for the liquids management approach or, as I call it, the immediate reactive approach. If we had perfect faith in the liquids management activity, then, presumably, there would never be any need for ground water monitoring and response. However, this is not a perfect world and, thus, we felt a two-phase regulatory program was the best approach.

There are four elements to the ground water monitoring and response program. First, before hazardous constituents are identified or known to be in the ground water, an owner or operator is required to monitor the ground water at the edge of his place for a series of indicator parameters. Should that occur—in other words, a leachate plume would be indicated—the owner or operator must notify the agency of the State, and is then responsible for determining what hazardous constituents have entered the ground and at what concentration levels they occur.

At that point, the second element of our ground water protection standard takes over. We develop concentration limits for individual hazardous constituents that are known to be in the ground water, and this is included in part of the permit.

Once the concentration limits are set, the third element takes over. The owner or operator responsible for conducting compliance monitoring to insure that ground water protection is met. Compliance monitoring is required for a period of time equal to the active life of the waste management area. This is the period during which the agency would expect a significant leachate plume to be present in the ground water.

If at any point during compliance monitoring the ground water standard is exceeded, then corrective action is necessary. This is the fourth element of the ground water protection program. Most frequently, this will include counterpumping and treatment of the ground water. The purpose of the corrective action program is to bring the unit back into compliance with the ground water protection standard established. We also expect it to prevent migration of contaminated ground water from beyond the waste site.

EPA has assigned high priority to assuring that land disposal units are operated in accordance with these regulations. This current fiscal year, EPA and the States will conduct compliance inspections at 100 percent of the land disposal facilities. Each such facility will be inspected at least once in all subsequent years. Where these inspections indicate noncompliance with requirements, the agency will pursue all available avenues to promptly return the facility into compliance. If necessary, civil penalties and injunctive relief will be sought to force rapid compliant action.

Most units subject to the interim status ground water monitoring requirements have completed analyses already of quarterly samples taken in fiscal year 1982 to determine background conditions near the unit. They soon will begin comparing down-gradient samples with this background level. At regulated units where contamination is indicated, EPA and the States will assign a high priority requesting a permit application from the owner or operator. This action will allow the agency to impose the corrective action requirements of the July 1982 regulations at facilities where contamination is indicated.

Also, we believe we can undertake permit processing this year for 230 units subject to the 1982 regulations. While this nearly equals the number of hazardous waste landfills, our permitting strategy recognizes that land treatment units or surface impoundments may pose equal or greater environmental hazards. Therefore, permitting priorities—which we will be happy to discuss today—within this larger group of facilities will take into account the relative environmental risks among facilities based on their own individual design, operating and location characteristics, as well as the compliance history.

Our record in RCRA enforcement is a good one. This past year, inspections have increased working with the States over 64 percent. Our warning letters have increased 160 percent. Complaints are up 44 percent, consistent with the new program, and administrative orders issued on the basis of the complaints number 153. Additionally, we have been able to increase our RCRA resources for 1983. Approximately 75 new personnel in headquarters and in the regions will be assigned to the hard task of permitting and enforcing against these regulations. State hazardous waste grants for fiscal year 1983 have increased from 41 million to nearly 44 million. This increase is intended largely for expansion of our enforcement and compliance activities.

We have now turned our attention to fine-tuning and improving these regulations which still do need work. As announced in the Federal Register Tuesday, this effort will occupy much of our attention during the next 2 years. We look forward to reporting to this committee, as well as to the American people, on our progress in this area.

Before closing, Mr. Chairman, I would like to set the record straight on this administration's policy regarding landfills. In recent years, there has been increasing popular pressure to simply ban landfilling. The Agency agrees that landfilling of hazardous waste is generally less desirable than recycling or destroying the waste. In fact, in August of 1976, EPA issued a policy statement listing secure ultimate disposal or landfilling as the least desirable option for hazardous waste management and urging managers of hazardous wastes to treat and recycle wastes to the extent practical before resorting to land disposal. A copy of this has been submitted for the record.

This philosophy is based on the premise that wastes that are recycled or destroyed are not present in the land and, therefore, cannot create any problems in the future. Nevertheless, in the real world, right now there are about 2,000 land treatment storage and disposal units in the country. This is where most of our hazardous waste is going. Many of them are very much connected to the manufacturing operations across the country.

As a practical matter, closing these units in the immediate future would have, we believe, a very substantial impact on American industry and the economy. Capacity to handle all hazardous wastes via alternative technologies simply does not exist at the present time, and there is a real question as to whether it could be made to exist in the very near future. The same public that feels insecure near landfills also does not accept the siting of hazardous waste incineration, recycling or other types of treatment facilities in their neighborhoods. As a result, precipitously closing existing land disposal capacity would result in also closing a great deal of our production facilities and would provide substantial incentive for midnight dumping into our fields and streams.

We believe that most wastes can be satisfactorily managed in the land, and that it can be done with a reasonable margin of safety much more cheaply. In keeping with the general philosophy stated a little bit earlier, 1976, as well as repeated today, it may be that recycling or destruction is preferable from a strictly health and environmental protection standpoint. But for many wastes, the reduction in risk achieved is probably marginal and may not be worth the costs.

In conclusion, we believe that we have taken the needed first step in dealing with land disposal of hazardous wastes. We have gone far with these regulations toward making land disposal safe. These rules need to be confirmed and perfected, and we are working to do that.

Thank you, Mr. Chairman.

Mr. SCHEUER. Thank you very much, Ms. Lavelle.

[The prepared statement of Ms. Lavelle follows:]

STATEMENT OF
RITA M. LAVELLE
ASSISTANT ADMINISTRATOR FOR
SOLID WASTE AND EMERGENCY RESPONSE
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTE ON NATURAL RESOURCES,
AGRICULTURE RESEARCH AND ENVIRONMENT
COMMITTEE ON SCIENCE AND TECHNOLOGY
HOUSE OF REPRESENTATIVES

DECEMBER 14, 1982

Thank you. I am Rita M. Lavelle, the EPA Assistant Administrator for Solid Waste and Emergency Response. I appreciate the opportunity to be here today to discuss the recently promulgated Resource Conservation and Recovery Act (RCRA) land disposal regulations and the technical basis supporting those regulations. They were prepared in response to a mandate in RCRA recognizing the need for control over the movement and management of hazardous wastes. In response to that Congressional mandate, the Agency issued a series of regulations beginning on May 19, 1980, and culminating with the land disposal rules issued on July 26, 1982.

Significance of the Land Disposal Rules

The rules we are discussing here today apply to both new and existing surface impoundments, waste piles, land treatment units, and landfills. There are some 2000 such units currently operating in the United States according to our best estimates. A majority of these are "on-site" operations associated with manufacturing or other commercial activities that do not accept outside wastes. Permits granted to all disposal units over the next few years will be based on these rules.

Our goal in producing these land disposal regulations was to protect human health and the environment from risks of inadequate management of hazardous wastes. While there are some uncertainties, we believe that the rules we have adopted constitute a giant step forward toward this goal. The regulations were developed using the best information available. Nevertheless, there are some gaps in our knowledge that we are working hard to fill. As additional information is gathered we shall move to perfect these rules. In addition, we are also moving to identify those wastes that may pose a substantial risk when disposed in the land in spite of these regulations. Where appropriate, we intend to ban or restrict such wastes from land disposal facilities.

EPA has assigned high priority to assuring that land disposal units are operated in accordance with applicable regulations. This current fiscal year, EPA and States will conduct compliance inspections at 100% of the land disposal facilities. Each such facility will be inspected at least once in subsequent years. Where these inspections indicate non-compliance with requirements intended to protect ground water, the Agency will pursue all available avenues to promptly return the facility to compliance. If necessary, civil penalties and injunctive relief will be sought to force rapid compliance action.

Most units subject to the interim status ground-water monitoring requirements have completed analyses of quarterly samples taken in Fiscal Year 82 to determine "background" conditions near the unit and soon will begin comparing down-gradient samples with the background. At regulated units where contamination is indicated, EPA and the States will assign a high priority to requesting a permit application from the owner or operator. This action will allow the Agency to impose the corrective action requirements of the July 1982 regulations at facilities where contamination is indicated. We believe we can undertake permit processing this year for some 230 units subject to the 1982 regulations. While this is nearly equal to the number of hazardous waste landfills, our permitting strategy recognizes that land treatment units or surface impoundments may pose equal or greater environmental hazards. Therefore, permitting priorities within this larger group of facilities will take into account relative environmental risks among facilities based on their individual design, operating, and location characteristics as well as compliance history.

Development of the Rules

In the course of developing these rules, the Agency issued two proposals. On December 18, 1978, we issued a set of very specific regulations. These regulations essentially told owners and operators exactly how to build a land disposal unit--how thick to make the liner, what to make it of, etc. In the public comments, these regulations were criticized for providing insufficient flexibility to allow for optimum cost effective solutions. It was also pointed out that rules of this type tend to stifle technical innovation. Little incentive exists to design a better way of doing things if the Agency has prescribed precisely how they must be done.

Taking these comments to heart, on February 5, 1981, the Agency reproposed very general rules that required a site-specific risk assessment in most cases. In general, these rules would have allowed any facility design and operating practice and location if the owner or operator could demonstrate that it would not result in harm to human health or the environment. These very general rules were criticized by most commenters for being too costly to implement and fraught with uncertainty.

The rules issued in July 1982 are based on five policy considerations that grew out of the comments on the previous proposals. First, the new rules should reduce the uncertainties associated with the permitting process and, therefore, should not rely primarily on predictions of leachate transport and effects. Second, the unique nature of ground water as a fragile resource should be recognized. Third, since hazardous waste technology is still rapidly developing, the rules must not stifle innovation. Fourth, the rules must be readily implementable through the permit program. We wished to avoid the complex analysis required under the February 5, 1981 proposal. Fifth, the rules should produce significant environmental results.

Because there remain some technical uncertainties associated with hazardous waste management, we believe that a two phase regulatory approach is appropriate, one to serve as backup for the other. The regulations include design and operating requirements to control the movement of liquids through the facility and thus to control the generation and release of leachate. As a backup, the rules also include a ground-water monitoring and response program implemented through a ground-water protection standard and a series of ground-water monitoring and corrective action programs. The goal of this program is to maintain ground-water quality and to clean up any contamination that does occur.

Liquids Management

The liquids management program, implemented by the design and operating standards, is the first line of defense. It has three major goals. One is to keep liquids out of the facility to the extent possible and practical, thereby minimizing leachate formation. For example, the regulations contain rules for run-on control, and they require that closed facilities be covered with a low permeability cap to minimize infiltration of precipitation in the future. Second, the design and operating standards attempt to prevent leachate migration to the extent possible. During the operating life this is accomplished by the use of liners that act as a barrier to escape of liquids from the facility. We also require run-off controls for most types of facilities to prevent contamination of surface waters and surrounding soil areas. For surface impoundments, we have included rules to prevent overflow or overtopping of dikes. Third, the design and operating standards require removal of leachate formed during operation so that it will not be available for migration after closure. This is accomplished by a leachate collection system for piles and landfills. For surface impoundments, the waste must be removed or solidified at closure, thus eliminating liquids at that time.

Ground-water Monitoring and Response

The ground-water monitoring and response program is a backup for the liquids management program. If we had perfect faith in the liquids management activity, then presumably there would never be any need for ground-water monitoring and response. However, this is not a perfect world and, thus, a two-phase regulatory program was considered prudent.

There are four elements to the ground-water monitoring and response program. First, before hazardous constituents are identified or known to be in the ground water, an owner or operator is required to monitor the ground water at the edge of his waste for a series of indicator parameters. These parameters are chosen to serve as an indicator that the ground water is being affected by the facility. Should that occur, i.e., if a leachate plume is indicated, the owner or operator must notify the Agency or State and is then responsible for determining what hazardous constituents have entered the ground water and at what concentration levels they occur.

At that point, as the second element, the ground-water protection standard is developed and concentration limits for individual hazardous constituents known to be in the ground water are included in the permit. Typically, the concentration limits will allow no increase over background concentration in the ground water. In the case of the eight metals and six pesticides for which National Interim Primary Drinking Water Standards have been set, the drinking water standards will usually be set as the concentration limits. An owner or operator may also petition the Agency to allow some higher limit. The petition must demonstrate that the higher level will not harm human health or the environment at any time in the future.

Once the concentration limits are set, as the third element, the owner or operator is responsible for conducting compliance monitoring to ensure that the ground-water standard is met. Compliance monitoring is required for a period of time equal to the active life of the waste management area. This is the period during which the Agency would expect a significant leachate plume to be present in the ground water.

If at any point during compliance monitoring the ground-water standard is exceeded, then corrective action is necessary. This is the fourth element of the ground-water protection program. Most frequently, this will include counterpumping and subsequent treatment of the ground water. The purpose of the corrective action program is to bring the unit back into compliance with the ground-water protection standard established for the unit. We also expect it to prevent migration of contaminated ground water from beyond the waste site. Once corrective action has been initiated, it must be continued until all significant contamination has been removed.

Information Collection and Development

The technical information base that supports the promulgated regulations is quite substantial but by no means complete. First, the proposals of 1978 and 1981 generated numerous comments and data that were helpful in developing the final rules. Further, numerous meetings were held with the regulated community, the scientific community, and the public in general to collect up-to-date information. Additionally, the Agency sponsored a number of data collecting activities and research projects.

I would like to summarize some of this work. We have expended since 1980 about $15 million in hazardous waste land disposal related research. In addition, previous work on land disposal of municipal refuse also formed part of the information base used in developing these rules. Some 29 projects have been conducted or are currently underway to investigate necessary requirements for covers, liners, pretreatment processes, and other design and operating aspects of land disposal units. This work has included broad studies--such as an investigation of the appropriate design and construction of covers for landfills -- as well as more specific research. For example, one ongoing project relates to necessary soil bedding requirements for flexible membrane liners. In addition to work focusing on design and operation of land disposal units, 19 additional projects (totalling about $3.2 million to date) have evaluated how pollutants migrate when and if they get out of the engineered facility. Significant work has also been focused (7 specific projects) on available technology for ground-water monitoring. And, in conjunction with efforts to support Superfund cleanup activities, much effort has been expended in developing and evaluating remedial technologies.

In summary, as you can see, EPA has, over the years, collected substantial data, information, and opinions of both a policy and technical nature, related to the subject. This material was extensively used in developing the rules.

We are confident that the implementation of these regulations will result in a substantial improvement in the level of land disposal technology generally in place today. We believe that the approach used will effectively minimize the potential for harm to human health and the environment as a result of the operation of hazardous waste land disposal units. We also believe the rules to be both reasonable and practical. There is, however, some technical uncertainty surrounding some of the provisions. Scientific management of hazardous waste is a new field, and our technology and general knowledge is still developing. We believe, however, that we have incorporated into the regulations safeguards to prevent any serious health and environmental problems as a result of these uncertainties. Nevertheless, we are actively pursuing an extensive analysis and research program designed to fill the remaining gaps in our technical knowledge.

One of the tools we are using to evaluate the effectiveness of these rules is the Regulatory Impact Analysis (RIA). This is a major project designed to evaluate the cost-effectiveness of the current cap and liner requirements in protecting human health and the environment. This analysis is part of an on-going effort to tailor the stringency of requirements to reflect differences in waste characteristics and location. For example, the RIA will evaluate possible requirements to provide added protection for units in high population density locations and simplify requirements in low population density areas. This work will result in proposed changes to the rules where they are found to be insufficiently protective or, alternately, where requirements can be reduced without eroding the substantial protection afforded by the rules.

In developing these rules, we made some important decisions on some issues that have technical aspects. I would like to discuss a few of these more important issues with you here today.

Liner Requirements

The first involves the basis for the liner requirements. The purpose of the liner is to act as a barrier to escape of leachate and liquids. In landfills and waste piles the liner maximizes the efficiency of leachate removal. The liner and leachate removal system are the primary design features for protecting the subsurface environment during the operating life of the unit. (After closure, the principal means for minimizing leachate generation and migration is the final cover.) Unless damaged and when properly installed, research to date indicates that synthetic liners are essentially 100 percent effective in preventing the movement of liquids.

Clays, on the other hand, allow some percentage of the liquid impinging upon their surface to move into the structure of the clay liner. Because the liquid that has migrated into the liner is not available to be removed by the leachate collection system, it will ultimately be released to the environment at some later time, unless all the waste and the entire liner is removed at closure. The amount of liquid moving into a clay liner depends on a number of factors and can be anywhere from a few percent of the liquids reaching its surface to as much as a hundred percent if the impingement rate is quite low. The performance requirement for liners has, therefore, been written to require that liquids not migrate into the liner structure. Since synthetic liners are capable of achieving this, the requirement is practical and achieveable.

However, there is some uncertainty as to the relative ease with which synthetic and clay liners can be damaged or improperly installed. Some synthetic liners have failed. They can be damaged physically and they are subject, as well, to chemical damage through the application of incompatible wastes. Poor seaming at installation is also possible. All of these result from human error and any may cause leakage. The rules have been written to minimize the potential for failure due to human error, by requiring inspection and testing of the liner at the time of installation. A demonstration that the liner is compatible chemically with the wastes to be deposited in the unit is also required, as is an evaluation of the potential for the operating practices used to place the wastes on the liner system to cause damage to the liner.

We believe that these rules will go far in reducing the failure of synthetic liners, but we realize that human mistakes will occur leading to occasional damage. While moderate damage does not necessarily equate to a major leak, the possibility of some leakage supports the Agency decision to include the ground-water protection standard in these regulations as a backup. It should also be pointed out that clay liners can have similar problems and have occasionally failed. They are also subject to chemical damage and sometimes to uneven composition that leads to leaks through sand lenses and the like. There are no data which indicate that either clays or synthetics possess superior reliability. Both are subject to failure if damaged physically or chemically, or improperly installed.

Part of the difficulty in analyzing the history of the use of liners generally, has been that it is difficult to prove a negative. One knows that a liner has failed if ultimately, often after many years, the ground water becomes contaminated and causes some problem. On the other hand, in the absence of contamination or damage, one does not know for sure whether the liner is intact or not. While many synthetic liner installations apparently are working successfully, we cannot be absolutely certain they are not leaking at all. It may be that the leachate plume simply has not yet reached the ground water. Nevertheless, there is no technical or practical reason why synthetic liners cannot work to achieve the goals desired of them if care is taken in their selection and installation and in the operation of the unit. The July regulations are designed to ensure that proper care is exercised.

Generally speaking, there has been a vast improvement in liner technology in the past few years. The liner of today is not the liner of five years ago. There are new materials, new seaming techniques, and new methods of evaluating them. We expect liner technology to continue to improve given the impetus provided by these regulations. Our rules are flexible enough to be responsive to this improving technology.

To keep abreast of and in some cases to spur this technological improvement, we have a rather formidable list of current and planned liner research activities. Some I have already mentioned. Additionally, we have work underway to study the effects of inorganic leachate on clay liners. We have other projects studying the strength and durability of seaming techniques for synthetic liners and to evaluate the effectiveness of bedding materials as a protective device for synthetic liners. We are analyzing the effects of leachate constituents on the liquid transit time through compacted clay liners. We are studying the application of the principles of polymer chemistry to determine the impact of long-term aging on ultimate useful life of flexible membrane liner. And, we are evaluating the relevance of flexible membrane liner chemical resistance data in determining the useful service life of these liners. These are some additional examples of the research activities we are undertaking to confirm the wisdom of the regulations that were recently promulgated.

Application of the Liner Requirement

Another significant issue surrounding these regulations is the application of the liner requirements only to expansions of disposal units that occur after the permit is issued. Thus, new units, or lateral expansions of existing units after permitting, will be required to meet all of the liner and leachate collection standards. The rules exempt "existing portions" from these requirements, however. We have defined "existing portion" as being that part of a waste management unit (e.g., landfill trench) identified in the original Part A permit application on which wastes have been placed as of the date of the issuance of the permit.

Generally, the Agency does not believe it is a good idea to dig up existing facilities to retrofit them with liners.

This can be quite a dangerous practice if not conducted very carefully, and it is usually very costly and very disruptive. Many production operations depend on their surface impoundments or other units covered by these rules in their day-to-day operation, and to shut them down for an extended period to retrofit a liner could cause shutdown of the plant. Also, it is generally true that if a leachate plume is already migrating in the subsurface environment, retrofitting the leaking unit with a liner system will normally not prevent contamination of the ground water. This does not mean to say that such retrofit would not have any environmental advantage. It would reduce the length of time during which corrective action would be necessary.

Some people have commented that some land disposal units can be easily and relatively safely retrofitted. For example, these might include small piles and small surface impoundments. The Agency has not, however, been able to specify, at this point, a set of criteria for determining which units can practically be retrofitted and which ones cannot.

Probably most of the disagreement surrounding the exemption of existing portions centers on the fact that existing portions include those units identified in the original Part A permit application on which wastes have not at this point been placed but on which wastes will be placed before the permit is issued. Since permitting could take several years, this could include a number of possible units. Some feel that the Agency should impose the Part 264 liner and leachate collection requirements on the regulated community during that period, while they are still operating under interim status, i.e., after the effective date of these rules.

There are difficulties in attempting to apply performance-based liner and leachate collection standards during interim status in the absence of the interaction with the Agency provided by the permit process and its public hearing aspect. Generally speaking, performance standards must be translated into specific design and operating features and it is through the permitting process that an evaluation is made of specific design and operating features and a decision is made as to whether they will accomplish the specified performance standard. In any event, we believe that the problem may not be as large as some would have us to believe. The Agency believes that most owners and operators are going to place reasonably good liners under their new units during interim status in an effort to avoid triggering the ground-water protection requirements and the need to perform corrective action, which is, of course, very costly. The ground-water protection standard, in any case, applies to any unit receiving wastes after the effective date of the regulations and will serve as a backup to protect human health in the event some of these unapproved liners do fail. Third, the number of units which would qualify for the exemption is limited to those which were originally designated on the Part A permit application. This acts to limit the capacity of owners and operators to accept wastes in the absence of an approved liner. We intend to keep an eye on this situation and are actively working to identify practical alternatives for implementing these rules during the interim status period. If successful, we will propose modifications to the rules as appropriate.

Closure and Post-Closure Care

Another technically related question that arises from time to time is whether the closure and post-closure care requirements of the regulations are adequate. The current requirements are substantial. Owners and operators must develop a detailed technical plan covering closure and post-closure care. Each operating facility is required to have one at the present time. This will be evaluated and approved during the permitting operation. At closure, disposal units must be covered with a low permeability cap designed to minimize infiltration of precipitation into the unit. Additionally, any liquids in a surface impoundment must be either removed or solidified. If at closure there is little or no leachate in a unit and if additional liquid infiltration is minimized, then the potential for escape of hazardous constituents will also be minimized.

After closure, owners or operators must maintain the integrity of the final cover, repairing it as necessary. They must also continue to collect any leachate that does form and monitor the groundwater for any evidence of migration. This post-closure period is nominally 30 years but can be extended for cause. If migration is detected during the post-closure period, then monitoring must continue for a period equal to the operating life of the unit. If it is ever necessary to undertake remedial action to clean up a pollution plume, that work must continue until the quality of the ground water is back within the standard, however long it takes.

The monitoring and post-closure care rules are backstopped by financial responsibility requirements designed to ensure that money will be available to carry them out. Based on the closure and post-closure care plans, each owner or operator must establish a trust fund, a letter of credit, insurance, or demonstrate sufficient financial strength to properly close the facility and care for the facility after closure.

We believe that these safeguards constitute a substantial improvement in the long term protection of human health and the environment. As discussed in the preamble to the regulations, however, we have not yet been able to devise financial requirements to ensure sufficient funds to conduct remedial action should that become necessary in the post-closure period and the company owning the facility is defunct. Because we cannot predict if such work will be necessary or how much it might cost, it is difficult to know how much if any money should be ensured. Additionally, there remains the question as to which institutional mechanism will provide oversite of facilities into the distant future, after the end of required post-closure activities. We believe that problems with such facilities will occur rarely but we are speculating on what will happen 40 or 50 years from now and there is therefore some uncertainty. We are currently investigating the Post-Closure Liability Fund established under the Superfund legislation as a mechanism for dealing with problems in the out years.

Banning Landfills

In recent years, there has been increasing popular pressure to simply ban landfilling. The Agency agrees that landfilling of hazardous waste is generally less desirable than recycling or destroying the waste. In fact on August 18, 1976, EPA issued a policy statement (41 CFR 35050-51) listing "secure ultimate disposal" or landfilling as the least desirable option for hazardous waste management and urging those managing hazardous wastes to treat and recycle wastes to the extent practical before resorting to land disposal. (A copy of this has been submitted for the record.) This philosophy is based on the premise that wastes that are recycled or destroyed are not present in the land and therefore cannot create any difficulties in the future.

Nevertheless, there are about 2000 land treatment, storage, and disposal units in the country and most of the hazardous waste continues to go to them. Many of them are integrally connected to manufacturing operations. As a practical matter, closing these units in the near term would have, we believe, a substantial impact on American industry and the economy. Capacity to handle all hazardous waste via alternative technologies simply does not exist at the present time and there is a real question as to whether it could be made to exist in the near future. The public that feels insecure near landfills also does not accept the siting of hazardous waste incineration, recycling, or other treatment facilities in their neighborhood. As a result, precipitously closing existing land disposal capacity would likely result in also closing some production facilities and would provide substantial incentive for illicit dumping into our fields and streams.

We believe that most wastes can be satisfactorily managed in the land and that it can be done with a reasonable margin of safety more cheaply in this manner. In keeping with the general philosophy stated earlier, it may be that recycling or destruction is preferable from a strictly health and environmental protection standpoint, but for many wastes, the reduction in risk achieved is probably marginal and may not be worth the cost.

We believe that we have taken the needed first step in dealing with land disposal of hazardous waste. We have gone far with these regulations toward making land disposal safe. These rules need to be confirmed and perfected and we are working to do that. We think the next step is to identify those wastes that are so toxic, so mobile, so persistent, and potentially incompatible with our regulatory controls that they pose a continuing risk in the land environment.

Where capacity exists to manage these wastes by other methods, we shall ban them from land disposal or very tightly control disposal of them. In fact our rules already greatly restrict some of these (e.g. ignitables, reactives, and containerized liquids). In those cases where we determine that existing alternative capacity does not exist for some high risk wastes, we shall have to judge over what time period it can be brought on line and schedule regulatory action accordingly. In some cases, we expect research or development work to be necessary before alternative capacity will be available. We currently have an extensive research and development program covering incineration and other treatment techniques.

RCRA Risk-Cost Analysis Model

You specifically asked me to address the status of the risk-cost analysis model, which uses a system to estimate risks and costs for particular combinations of wastes, environments, and technologies. The model has been reviewed by EPA's Science Advisory Board, which made many general and specific suggestions that we will attempt to address over the coming months.

While the RCRA Risk-Cost Model will not be the sole basis for our regulations it will, nonetheless, serve an increasingly important role in the EPA's regulatory process. The decision to promulgate any rule is preceeded by a long series of steps: from identifying what the problem is, to determining which of the many alternatives available to the Agency is the most effective way to deal with it. The RCRA Risk-Cost Model is designed to be used at the initial stages of this process. When OSW undertakes certain tasks in the future, we intend to use the model, along with any other available information, as a screening device to point our analytical efforts in the most fruitful direction.

As an example, let me briefly explain how the risk-cost model is being used in the early stages of analyzing the issue of restricting certain wastes from land disposal facilities. We are running the model to simulate the disposal of hazardous wastes in landfills. A preliminary analysis of the results indicates that about two dozen hazardous wastes pose significantly greater risks in landfills than do others, and that certain constituents are repeatedly found in these wastes. Although this information would certainly not alone define the universe of wastes and constituents that EPA ultimately investigates as candidates for land disposal restrictions, we will be certain to focus attention to the wastes identified by the model.

For each task that we use the model, we will prepare a report that will summarize what the model can teach us about the issue. Naturally, certain components of the model are stronger than others, and the conclusions in the reports will reflect our confidence about the strength of underlying data bases and methodologies. We intend to continue to solicit the input of interested parties in the proper use of the model by preparing and distributing these reports.

These are just a few of the issues which the Agency faced during preparation of these rules which have some technical aspects. Most of these are addressed in much more detail in Preamble to the regulations (47 FR 32274, et. seq.). We have submitted an excerpted version of the relevant paragraphs of the Preamble for the record.

In summary, we believe these regulations close the loop in regulatory protection of human health and the environment from inadequate hazardous waste management practices dealing with land disposal. Virtually all such practices are now controlled. For land disposal facilities, these regulations provide a necessary level of basic protection. We are now analyzing the sufficiency and efficiency of these rules and proceeding to do the studies and research necessary to fill the knowledge gaps that currently exist. We are additionally studying the risks posed by specific wastes in the land disposal environment in spite of the existing rules. All of this work will almost certainly result in modifications and additions to the current rules to make them more effective and efficient.

I thank you very much for the opportunity to share these thoughts and will be pleased to try to answer any questions you might have.

Mr. SCHEUER. Ms. Lavelle, on page 16 of your testimony, you enumerate a number of research projects that you have going on—on page 15 and 16, I should say—current and planned liner research activities, to study the effects of organic leachate on clay liners, the strength and durability of seaming techniques for synthetic liners, effectiveness of bedding materials. Then you go on to say on page 16,

> These are some additional examples of the research activities we are undertaking to confirm the wisdom of the regulations that were recently promulgated.

Isn't that a little inconsistent with the position that EPA had taken in other matters, that you are going ahead and regulating on the basis of what I presume you would admit is a grossly inadequate data base? You have issued your regulations and you are going to rely on the research that you are doing today and tomorrow and next week to confirm the wisdom of the regulations that you recently promulgated, to quote from your testimony.

I would have to say that this is extraordinarily inconsistent with the position of your Agency and this administration on their treatment of acid rain. Their treatment of acid rain, in effect, says that until you present us, until we have absolute knowledge, with the last scintilla of evidence, we are not going to regulate, we are not going to attempt to impose any burdens whatsoever on industry because, in the absence of absolute knowledge and in the absence of being able to prove a linear cause and effect relationship between an emitting pollutant source here and polluting effects 500 or 1,000 miles away—in the absence of proving an absolute linear cause and effect relationship there, in the absence of a perfect scientific data base, we are not going to do anything that imposes any costs on industry whatsoever. We simply aren't going to ask them to lay out any funds.

Here you are saying that because landfill, land disposal of very toxic, very hazardous wastes is the cheapest way for industry to go about the business of disposing of solid wastes, we are going to let them do it, we are promulgating regulations letting them do it, and we are going to do the research in the future in the hopes that maybe some of this research will justify the regulations that we issued earlier this year.

Even you, yourself, stated in the preamble to the regulations, "Eventually, liners will either degrade, tear, or crack"—I am quoting from the preamble to your regulations—"and will allow liquids to migrate out of the unit." We have heard witness after witness after witness say that the barriers which you describe, the liners, are unreliable, that synthetic and clay liners are unreliable, and will ultimately leak and release hazardous wastes into the ground water. This is exactly what you say in your preamble, and this is what witness after witness after witness told us in the last couple of weeks. I am sure you have copies of their testimony.

As I said, in the case of acid rain, you are waiting to impose any costs whatsoever on industry until the last "i" is dotted and the last "t" is crossed and the last jot and tiddle of perfect finite evidence is in before you act at all. And, as I say, here you are acting to permit the wanton, indiscriminate use of land disposal of the most toxic wastes before you have any solid evidence that this is justified—proven in your own words in your preamble—you hope to justify the wisdom of this act in research results that will be coming out in years to come.

How can you justify this to the American people, this bizarre contradiction, this bizarre conflict, between the policy of your agency in dealing with toxic wastes and the policy of your agency in dealing with acid rain? They have only one common thread running through them, that is saving industry the necessity of investing any money, any capital, to protect the public health and to protect our environment.

Ms. LAVELLE. Mr. Chairman, the purpose of our regulations on hazardous wastes—I am not in a position to discuss acid rain—has always been consistent, to protect the human health and the environment. The situation is that 90 percent of the hazardous wastes of this country is indeed being disposed of or treated in and on the land. What we are faced with is the knowledge certain of that fact.

We decided to come up with regulations that would indeed insure protection of human health and environment, and we came up with both protective standards which we equate with D&O standards, as well as reactive standards which are those which call for ground water protection and cleanup.

Perhaps Dr. Skinner could discuss more in detail how the research is envisioned to support the refinement of these regulations as opposed to supporting the need which we feel is already there.

Mr. SCHEUER. If we listen to the words of the witnesses who have appeared before us for the last several weeks, the need is to stop the use of land disposal for the most toxic chemicals, to put a hold on that, to put that in a holding pattern until we devise ways and means which our research will justify before we promulgate the regulations, will justify as protecting the health and safety and lives of the American people.

Here you are permitting a process to take place which history has proved that it is perhaps anywhere from 10 to 100 times more expensive to remedy after the fact than it would have been to engage in proper disposal, perhaps alternative disposal methods, if that had been done in the initial instance, by detoxification and by incineration—perhaps by ocean dumping, who knows. We find this to be a very unfortunate situation.

Dr. SKINNER. Prior to the promulgation of these regulations, there were no effective Federal controls at all on the placement of wastes on the land. We recognized that these are interim regulations. We put them out, and we have been very conservative in certain aspects of the design.

Let me give you an example. We required the use of the most effective liner that we know of technologywise today. Admittedly, there are some unknowns in that technology, but we do require the use of a synthetic liner.

Mr. SCHEUER. Let me just interrupt you. Your stated views in the preamble and the stated views of all of the witnesses make it perfectly clear that synthetics are intrinsically unreliable and cannot be counted upon to provide anything like a permanent barrier.

Dr. SKINNER. Let me address that. Let me finish the point I was making, and I will address synthetic liners explicitly.

The point I was making was that when we established the requirement for a synthetic liner, which is the most protective in terms of liner technology, we were being very conservative, we were pushing the state-of-the-art technology. As we do more research, we may find that, under certain circumstances, different types of liners would be more appropriate and we will refine the regulations accordingly based upon that research. That is what the statement in the testimony indicated.

You are correct in saying—and we admit it in our preamble—the liners eventually will leak. That is why we built in redundancy into the management system. That is why, in addition to the liner, there is a prohibition of placing containerized liquids in the facility; in addition to the liner, there is a requirement for a cap on the facility; in addition to the liner, there is a requirement for groundwater monitoring at the facility. So we are not relying on the liner alone.

Mr. SCHEUER. There are no research results that give us confidence either in caps or in liners. You say in your statement, Ms. Lavelle:

> Research to date indicates that synthetic liners are essentially 100 percent effective in preventing the movement of liquids.

According to repeated testimony that we have had, that is absolutely not true. Furthermore, we have had compelling testimony that caps themselves are no more effective as a permanent barrier than are the liners. The state-of-the-art simply gives us nothing that we can really rely on.

So it really concerns us deeply that you have gone ahead and, in effect, opened the doors to continued and expanded toxic waste disposal.

Ms. LAVELLE. Mr. Chairman, rather than opening the doors, we are closing the doors. I think that perhaps there is a misunderstanding of what we tried to do with these regulations.

Mr. SCHEUER. You are permitting expansion of the 2,000 existing sites, are you not?

Ms. LAVELLE. We are permitting regulated expansion for the first time against design and operating standards which should have been in place and were not in place.

Mr. SCHEUER. Ms. Lavelle, when you talk about regulated expansion, you say on page 2 or 3 of your testimony that each of these projects is going to be reviewed each year by your Agency and by States. Now your Agency is being cut in its staff, the environment staffs of States are being cut. For you to say——

Ms. LAVELLE. Mr. Chairman, for the hazardous waste components, there is no cut. In fact, the administration has supported an increase in hazardous waste resources, both at the Federal level and at the State level. This is consistent with——

Mr. SCHEUER. Ms. Lavelle, your Agency has cut the funds that are available for State enforcement in the area of hazardous wastes and other matters. You have attempted—your Agency has requested of Congress a cut in the funds that are available for State enforcement. We have been fighting that fight up here.

Yet, you say on the bottom of page 2,

* * * EPA and States will conduct compliance inspections at 100 percent of the land disposal facilities. Each such facility will be inspected at least once in subsequent years.

Ms. **Lavelle**. That is right, Mr. Chairman.

Mr. **Scheuer**. Does that mean once every year in subsequent years?

Ms. **Lavelle**. Yes, sir.

Mr. **Scheuer**. We simply, with the kind of reduction that is going on at the Federal level——

Ms. **Lavelle**. Mr. Chairman, there is no reduction in hazardous waste enforcement; it is an increase. In working with the States, there is a net major increase. We have a 106-percent increase in our inspections over 1981. We will continue this. For the first time, we have regulations against which we can inspect. These are no longer paperwork violation inspections. These are inspections against regulations which were long overdue.

We have a very involved schedule. We have it broken down by States. We have worked with the States through their cooperative agreement so that when they get their grants, they indeed are committing to outputs which involve inspections. The facilities we will inspect, as I said in my testimony, our outlines so that we address those wherein, due to a compliance history and other records, we know that the need is there for an environmental protection as soon as possible.

I would say, Mr. Chairman, that for the first time, we can call for effective construction, operation, and closure of land disposal as a technology. It is a real technology. We can get into that and discuss it. I would like to do that for the purpose of the record. I would like to explain why, if anything, the 22 commenters who have sued us on the basis of promulgating these regulations are saying we are being too restrictive. I would like to get into that discussion and explain to you what exactly these regulations call for. I think it would be good for the sake of the committee.

Mr. **Scheuer**. From our point of view—and, of course, you will have your chance to elaborate on your testimony—we feel both that the barriers, the caps, the liners—we feel that the testimony is clear that the overwhelming accumulated weight of the testimony is that the barriers simply don't work and cannot be relied upon to work.

Ms. **Lavelle**. Mr. Chairman, we are not saying in our regulations that they will work.

Mr. **Scheuer**. Let me continue.

Second, as far as the monitoring every year is concerned, the monitoring by Federal and State officials, we don't begin to have adequate monitoring technology. Mr. David Miller, an expert in ground water hydrologist stated that, and I quote:

> Compliance monitoring may be beyond the state-of-the-art of the ground-water science.

In other words, we simply don't have the facilities to monitor the widespread presence of the most toxic chemicals in our ground.

If we did have the ability to monitor and identify these toxic substances, we really don't have the ability adequately to isolate them through any kind of barrier or cap or liner, as you yourself in the preamble of your regulations admitted.

Ms. LAVELLE. Mr. Chairman, what we tried to do, and I think we were very successful in this, is come up with regulations that have a number of redundancies built in. The technologies that we call for to be employed, that is, the liner, the ground water monitoring, are technologies of which we have a great deal of knowledge. We can discuss that, and I hope we will be able to discuss that in depth today. These technologies will work, properly constructed, properly managed, and properly closed.

As I tried to ourline in my opening remarks, the regulation is set up so that it is protective—that would be all of the D&O standards—as well as reactive with all of the ground water monitor standards. Additionally, we have financial assurance requirements of the management of these facilities that they are indeed being protective and reactive and are protecting human health and the environment.

I just hope that we can get in and discuss some of this in depth. That is what I had hoped we would do today.

Mr. SCHEUER. From our point of view—and as I say, we have no time limitations here.

Ms. LAVELLE. Good.

Mr. SCHEUER. We are not under any pressure. You will have all of the time in the world.

Ms. LAVELLE. Good.

Mr. SCHEUER. Our general feeling—and time and events could prove us wrong, and I hope they will—but our general feeling is that this regulatory structure and its triad of intellectual underpinnings, let us say, is basically flawed and it doesn't meet the test of real life.

The first element that is flawed is the supposition that you can isolate these toxic wastes once they are in the ground from ground water. We have had your admission in your preamble and the testimony of dozens of witnesses that they cannot be relied upon. The caps cannot be relied upon. The liners cannot be relied upon. The barrier method simply doesn't work.

Second, the monitoring may require a capability that is beyond the state-of-the-art. We have had testimony from Mr. Miller and we have heard it from others. So the monitoring may not even be able to identify those sites.

Lastly, the human condition, the human character, as we know it, does not meet the extraordinarily high standards of purity and idealistic volunteerism that must be a concomitant of your regulations. On page 7, you say that should a leachate plume be indicated or should there be any other flaw in the barrier isolating these poisonous toxic substances from ground water, the owner or operator must notify the agency or State and is then responsible for determining what hazardous constituents have entered the ground water and at what concentration levels they occur.

I must tell you, Ms. Lavelle, that I have been in and out of the Federal Government, both the executive branch and the legislative branch, for the last 40 years. My first job was as a P-1, the lowest form of mankind, the lowest species of humankind, in the Foreign

Economic Administration. I was paid $2,000 a year, and I was vastly overpaid. That was in 1942, and I have been at it ever since.

You and I, neither of us, rolled into town on a hay wagon last week, we have both been around. It has not been impressed upon my consciousness that either executives in the executive branch, which both you and I have been, or entrepreneurs in the private sector, as I have been and as many of the constituency that you work with have been—it has not been my impression that these groups are composed exclusively of plaster saints and of people who respond instantaneously and nobly to the highest level of demand of goodness and responsiveness to the public interest.

When you say the owner or operator must notify the State or agency of whatever leakage is taking place and then be responsible for determining what hazardous constituents have entered the ground-water and at what concentration levels they occur, you are defying every known lesson of the human condition that we have learned in the last 5,000 years of recorded history.

I am not one who believes that businessmen are intrinsically evil or inferior or morally lacking. I believe that they are all human beings and that they are basically good people. I believe that of bureaucrats. I believe that of people who are running the executive branch now. I believe in the perfectibility of the human condition. But it hasn't happened yet. And there is instance after instance—I don't have to cite you Love Canal and Kepone and go through the whole horror story, the whole laundry list of horror histories to indicate that corporations don't act like that.

Yet, here you are relying on barrier methods that don't exist as an actuality. You are relying on surveillance and reporting methods that may be beyond the state-of-the-art, that may be beyond that ability of States and the Federal Government to ascertain. You are relying on staffs for surveillance and monitoring at the Federal and State level that I profoundly believe are inadequate to do the job of carrying on an inspection once a year of each of these hazardous dumping sites. And you are relying on the goodness of the human spirit in the corporate community promptly to report, promptly to carry out determinations of the degree to which hazardous substances have entered the ground water and what remedies should take place. It flies in the face of all of our experience.

As I say, I don't want to get into the business of cataloging corporate wrongdoing or Government inaction and default by nonperformance. I am simply saying that you have erected a regulatory structure that is a house of cards and it can't possibly work. Any objective outsider who would look at it would say this mechanism is serious flawed in each one of its triads or in each one of its intellectual underpinnings. And I don't know how you can really propose that to the Congress and to the American people as a mechanism seriously designed to protect the public health and the public environment.

Ms. LAVELLE. We are obviously convinced it will protect human health and the environment if properly followed, and we have invested the resources to insure that that is the case.

I would submit, Mr. Chairman, that the lack of knowledge that you allude to is actually what is being employed to clean up right now at Love Canal and many sites across the Nation, where we are employing various methods, counterpumping methods. Our knowledge of ground water control monitoring cleanup is increasing daily, and it is a very good new story.

As Dr. Skinner said, we are pushing the state-of-the-art. We sat down and we decided that this is the technology that is being employed right now by 90 percent of those people who dispose of hazardous wastes. Why not insure that that technology is working as best as it can to protect human health and the environment? We have developed regulations with a number of redundancies built in, and we are here today to discuss these regulations with you so that we can convince you, Mr. Chairman, that that indeed is the approach and that it will work.

Unfortunately, we can't regulate the human spirit and ethics, and maybe that is fortunate. But we have set up a pattern which we hope we can discuss which will indeed insure that this technology, properly constructed, managed and closed, will protect human health and the environment and will handle our hazardous wastes so that we are not encouraging midnight dumping.

Mr. SCHEUER. I would say that we should develop that technology, we should develop that capability, and we should apply it to these 2,000 sites, as soon as it is perfected and as soon as you have completed the research that would justify your—in your own words, which would justify the wisdom of your regulations. But until that is done, it seems to me that it would be very wise for us to put the whole business of ground disposal of hazardous wastes in a holding pattern and look to alternative technologies—which may be more expensive, admittedly, but which the consumer is going to pay for in the end anyway—technologies such as detoxification and incineration which will protect the public health, albeit at some increased cost which the consumer will ultimately put in his bills for the goods and services that he buys.

Ms. LAVELLE. Mr. Chairman, the same point you made about the human spirit, I think, would encourage midnight dumping if we immediately ban landfills as a technology and say you no longer can dispose of your wastes. There is not the technology available right now for alternative means of handling hazardous wastes.

We, however, in our long-term planning are addressing alternative technologies. Indeed, 50 percent of our R&D budget in hazardous waste is devoted to alternative technologies to insuring that they will be protective and are indeed protective to the human health and the environment as they become available. What would the option be? Would it be not to regulate this hazardous waste?

Mr. SCHEUER. No.

Ms. LAVELLE. If Superfund has shown us anything, it has shown us that this hazardous waste must be regulated, it must be properly handled, properly managed, and properly disposed of.

Mr. SCHEUER. I would like to see it more stringently regulated. I would like to see a prohibition on further disposal of the most toxic substances by land disposal.

Ms. LAVELLE. We would, too, Mr. Chairman.

Mr. SCHEUER. Hold on. Let me finish.

I would like to see a prohibition on further disposal of toxic wastes by landfill. I would like to see a requirement of using other available technologies which have been tested, incineration and detoxification. They have been tested, and they have been found adequate for most toxic wastes. I think we ought to put any further expansion of toxic wastes dumping on land of the most toxic chemicals in a holding pattern and relying on these other technologies until you complete the research that you have done that may or may not justify the wisdom of the regulations which, in our view, have been prematurely promulgated, the regulations of earlier this year.

I would like to yield to my colleague, Claudine Schneider.

Mrs. SCHNEIDER. One of the things that I would like to get back to is our discussion of the regulations requiring the owners and operators to really essentially be performing their own corrective actions and cleaning up contaminated water.

I would just like to know if EPA can identify for us how many contaminated sites there are in this country right now, contaminated ground water sites? Do you have that number on hand?

Ms. LAVELLE. We have, through our RCRA reporting requirements, as well as our 103(c) Superfund reporting requirements, a universe right now of 14,000 possible sites of contamination. These are being broken out right now in terms of whether it is a ground water contamination problem and whether it is indeed even a hazardous waste site.

Mrs. SCHNEIDER. Is this the first cataloging that has been done by the EPA, or do you have some comparative analysis of the number of ground water sites that were contaminated, for example, 10 years ago?

Ms. LAVELLE. I think you are leading up to the surface impoundment study that was done 10 years ago, wherein it was felt that there was a lot of ground water contamination going on because of surface impoundments.

Jack, do you have any more studies?

Mr. LEHMAN. Congresswoman Schneider, there was a—I am not too familiar with this—but under the drinking water program at EPA, there was a study made of all surface impoundments. An estimate of the relative hazard of those impoundments was made on a scale of 1 to 10. There was not specifically a lot of ground water monitoring done to confirm this. It was all based on, if you will, surface inspection of the situation.

Mrs. SCHNEIDER. I see.

Ms. LAVELLE. Congresswoman, I think your point is well taken that we need ground water monitoring studies in order to determine if there is a problem out there. Come January of this year, the ground water monitoring reports are due. This is a report that we should make to Congress and to the American public establishing once and for all what, if any, is the problem out there.

Mrs. SCHNEIDER. Are you in a position right now—for example, your testimony mentions that there are currently about 2,000 land disposal units. How many of those are unlined? Can you define how many are unlined?

Dr. SKINNER. The first requirement for a liner was put in place this July and will be implemented through the permits that we are issuing over the next couple of years. I would assume that most of those facilities are unlined.

Mrs. **Schneider**. But we have no accurate studies or information what EPA has done to know what is and what is not lined?

Dr. **Skinner**. I think that we assume that most of those are unlined because there was no requirement in many instances for them to place a liner prior to our most recent requirement.

In addition, just recently, just of the last year, we placed a requirement on those 2,000 facilities that they monitor ground water for the first time, and we will be getting the results of that in early next year and we will have some sense for the extent of contamination. That will then serve as the basis for us requiring liners at those facilities during the period process.

Mrs. **Schneider**. OK. You just made the statement that it is your assumption that those sites are unlined because they have not been required to be lined. In the same breath, you are saying that the regulations that EPA has formulated which require owners and operators to essentially police themselves, that that will in fact be done.

I certainly have a great deal of questions, as did the chairman, as to what kind of guarantee there is in these regulations for corrective actions by these facility owners and operators.

Dr. **Skinner**. When we require a facility to line, we do that through the permit process, and they will not be policing themselves during that process. We will inspect the facility, we will oversee the installation of the liner, they will be required to submit——

Mrs. **Schneider**. Right. But that is the first move. What we are concerned with is ground water contamination. That takes place after the site has been lined, after the landfill is being used. What guarantee is there that there will be a monitoring process and by whom for purposes of protecting the public interest?

Dr. **Skinner**. We will do compliance inspections of those facilities. They are supposed to keep records. If they are not keeping records, enforcement action will be taken against them. We will do sampling of the wells ourselves if there is no indication that they have been doing it themselves. We will issue compliance orders to require them to do that. We will inspect the facilities and enforce.

Mrs. **Schneider**. How often will that be happening?

Dr. **Skinner**. At least once every year, we will inspect all land disposal facilities.

Mr. **Scheuer**. When you say "we," does that mean the Federal Government and the States or EPA itself?

Dr. **Skinner**. EPA and the States that we have authorized to do that for us.

Mrs. **Schneider**. Let me ask you one other question that is very basic. How on Earth are you going to be able to do that when the requested funding from EPA and Superfund is going through some very severe fluctuations? Granted the money for the Superfund overall that will be coming forward increased by about $100 million, but it has come to my attention that the request for personnel, who would in essence be the people doing the inspecting, doing the paperwork, and checking up on compliance, is to be cut by 15 percent.

Ms. **Lavelle**. Mrs. Schneider.

Mrs. **Schneider**. Let me finish.

You are going to cut EPA personnel 15 percent. In addition to that, if you say let's let the States take on that responsibility, the funding to the States is also being cut significantly insofar as the State grant program is concerned. So now we have money in the Superfund, but we do not have money for the administration of compliance with the regulations that EPA has formulated. How are you going to do that, given the proposed budget for 1984?

Ms. LAVELLE. Congresswoman, there is no cut. In fact, in 1983—then I will discuss 1984—we have an increase of about 150 FTE in both the RCRA and Superfund sides of the house due to the Administrator giving us the ability to reallocate personnel within the Agency. The 1984 proposal that we sent to OMB was consistent with those numbers.

I am not privy to what you are quoting from, but perhaps it is part of the passback from OMB which is still in the editive phase, and we are fighting very hard for those resources, as Mrs. Gorsuch has already indicated publicly.

Additionally, on the funding of State grants in hazardous wastes, we are not proposing a cut. Indeed, in the 1983 cycle, it went up, as I pointed out, from $41 million to $44 million.

I think another important part of this whole concept is that the States are seeking responsibility for their own hazardous waste program. Right now, there are 22 fee systems set up in 22 different States with 11 more proposed. They are rather young yet in terms of being a fee system, but I think it indicates the popularity of this program and the need that the American people feel that there should be regulation.

Mrs. SCHNEIDER. Might I just mention not only the complexity, but the total bureaucratic disastrous mess that would occur if we let each State regulate their own disposal of wastes in these landfills.

Ms. LAVELLE. Mrs. Schneider, we are insuring—and we would like to make that point clear—through our authorization process that there will be no disastrous mess. In fact, the States, in order to be authorized to handle their hazardous waste program, which is consistent with the 1976 RCRA Act that was passed by Congress, they must be substantially equivalent to and protective as the Federal standards that we set.

Mrs. SCHNEIDER. You said that EPA was asking for more money than was stated in the OMB passback. You mentioned that in 1983, the figure for State grants had been increased to $40 million.

Ms. LAVELLE. Yes.

Mrs. SCHNEIDER. I understand that in 1984, what is being sought is $40.8 million. Could you give us a figure that EPA, your office, is requesting? You say you are requesting increases. How much are you looking for for the State grant program?

Ms. LAVELLE. I am not allowed to discuss the 1984 until the President announces it. But I can stand here before you today and say that the money we are requesting is consistent with the program that is based on permitting and inspections where we insure the land disposal inspection program we outlined for you today.

Mr. SCHEUER. Let me interject there.

You seem to be taking credit for the good work of the Congress, Ms. Lavelle. Your Agency requested a reduction in State grants for enforcement.

Ms. **Lavelle**. Yes, we did.

Mr. **Scheuer**. A reduction from $41 million to $37 million.

Ms. **Lavelle**. Yes.

Mr. **Scheuer**. It was the Congress that increased it to $44 million.

Ms. **Lavelle**. That is right.

Mr. **Scheuer**. It seems to me when you sit there and testify that money for State agencies is going up from $41 million to $44 million, you are being a little bit disingenuous. Your Agency wanted to cut from $41 million to $37 million, and it was the Congress that took charge and raised that budget for State enforcement to $44 million.

So how can you sit there and represent that it is the policy of the Agency to increase the capability of States to conduct these enforcement activities when, in point of fact, it was the intent of the administration and your Agency to drastically cut their budgets?

Let me go just a little bit further, Ms. Lavelle.

Ms. **Lavelle**. Are you going to let me respond?

Mr. **Scheuer**. OK, briefly.

Ms. **Lavelle**. I was not trying to be disingenuous. I was trying to answer the Congresswoman's question about 1983 funding. I did not try to claim credit for this administration as proposing an increase. We did, indeed, propose a decrease.

Mr. **Scheuer**. That wasn't quite clear from your testimony.

Ms. **Lavelle**. OK. I want to make it perfectly clear, though, for the record, that we are committed to the States taking on the hazardous waste program. We will propose cuts consistent with what we did—not us, but what the prior administration did—with the Solid Waste Act, wherein as the States are financially capable and willing to take on management of their programs, they indeed do so. So there will be cuts over a matter of time.

Mr. **Scheuer**. Mrs. Schneider.

Mrs. **Schneider**. I have one last question. Are you requesting cuts in the Superfund personnel below the 1983 level?

Ms. **Lavelle**. No, madam.

Mrs. **Schneider**. You are not.

Although you cannot give us a figure of what an increase you are asking for, you are asking for an increase as opposed to a cut in what has been proposed?

Ms. **Lavelle**. I proposed that to the Administrator.

Mrs. **Schneider**. Pardon me?

Ms. **Lavelle**. I proposed that to the Administrator.

Mrs. **Schneider**. I am not asking you this time for a specific figure. All I want to know is are you proposing cuts in Superfund personnel, or are you proposing increases?

Ms. **Lavelle**. It would be level to increases on 1983.

Mr. **Scheuer**. OK. We are going to suspend for about 12 minutes to catch this rollcall vote.

[Recess.]

Mr. **Scheuer**. The subcommittee will come to order.

Ms. Lavelle, we are concerned with the question of staff morale and, consequently, staff effectiveness at EPA. Recent reports indicate that you have engaged in extraordinary efforts to discredit the expertise and silence the communication of an employee in your office, Mr. Hugh Kaufman, for speaking out against policies of EPA which he finds troublesome—in particular, his testifying at a hearing of Mr. Florio's subcommittee on certain aspects of Superfund and the fashion in which EPA was implementing Superfund.

Is it your policy to threaten or to terminate employees who testify before a congressional committee like this one or who otherwise legally express their views on the actions of EPA?

Ms. LAVELLE. That is certainly not my policy, and I have stated that a number of times publicly.

Mr. SCHEUER. Well, this gives you a chance to state it again publicly.

Did you ever have a meeting with the Inspector General of EPA with respect to Hugh Kaufman?

Ms. LAVELLE. Yes, Mr. Chairman.

Mr. SCHEUER. Would you tell us about the meeting, when was it and what was the substance of the discussion?

Ms. LAVELLE. Since I am under oath, I would like to have counsel, if that is appropriate and within the procedures of this committee.

Mr. SCHEUER. Since you were present and were a main actor at that hearing, I would prefer you to testify.

Ms. LAVELLE. Mr. Chairman, I am currently appealing the decision of the Department of Labor. I am also very concerned about elements of the Privacy Act as to what I can and cannot say. I am not trying to avoid your questions, I just, not being a lawyer, I am just concerned that I might do something inappropriate with regards to the Privacy Act.

Mr. SCHEUER. Let me ask the questions, and if you don't care to answer them, we are not going to drag you kicking and screaming to the Federal can.

Ms. LAVELLE. Yes.

Mr. SCHEUER. Did you at any time express to the Inspector General or any other top EPA official your desire to have Mr. Kaufman fired?

Ms. LAVELLE. I don't think I should answer that, Mr. Chairman.

Mr. SCHEUER. You can't tell us that you never expressed your desire to have Mr. Kaufman fired?

Ms. LAVELLE. I don't want to say I did or I did not. I think that is something that is covered in this whole appeal with the Labor Department. Again, I am very concerned about elements of the Privacy Act. Not being an attorney, I don't know what I can and cannot say.

Mr. SCHEUER. I can tell you that I am an attorney.

Ms. LAVELLE. Good.

Mr. SCHEUER. Although I am not sure I would hire myself. I am not sure I would rely on my advice which I am going to give to you gratuitously at this point. But we are not involved in a legal proceedings before the judicial branch of Government.

Ms. LAVELLE. But I am under oath as a Federal official.

Mr. SCHEUER. Indeed you are, and I am glad you are aware of it.

Is it a coincidence that you met with EPA Inspector General Mat Novick and Assistant Inspector General for Investigations Richard Campbell in March, shortly before Mr. Kaufman's appearance before Congressman Florio's subcommittee in a hearing on Superfund? Is that a pure coincidence?

Let me ask you a further question. Did you in the course of this meeting ask Mr. Novick to initiate an investigation of Hugh Kaufman because he was making statements that were embarrassing to the Agency?

Ms. LAVELLE. Mr. Chairman, I can speak to some of this because it is in public records. I asked—rather, I was informed of a request for an investigation, one investigation of one instance with Mr. Kaufman. I am not sure that this was the March timeframe. I, frankly, didn't know you were going to discuss this, so I didn't doublecheck my time.

But the particulars of the case were such that Mr. Kaufman—and again, the only reason I am discussing this much is this has been made public and it is not germane to the Privacy Act—Mr. Kaufman put in for sick leave and he was indeed not sick. That was the basis of the investigation that was requested. The Inspector General——

Mr. SCHEUER. Is it true that you requested the investigation?

Ms. LAVELLE. No, sir, I did not. I was called by the Inspector General—let me clarify this, OK? I was called by the Inspector General saying that there had been a call on the hotline that our Inspector General employs where anyone can become a whistleblower of any fraud or abuse. He said that there were a number of calls that Mr. Kaufman was giving a speech the following day and that he had put in for sick leave and that this is an apparent pattern of this particular employee and that, as such, he was going to conduct the investigation.

I agreed, I guess you could say, to the investigation at that point because it seemed the appropriate action to take and, indeed, was not unique to this particular employee. I had agreed to investigations of a similar nature in the past with some other employees.

Mr. SCHEUER. Let me ask you again specifically, did you personally ask the Inspector General to conduct an investigation of Mr. Kaufman both for conflict of interest and to check his time cards in relation to his speeches? Did you personally ask him to investigate Mr. Kaufman?

Ms. LAVELLE. That is certainly in dispute with the Department of Labor.

Mr. SCHEUER. Did you advise Mr. Novick and Mr. Campbell that you wished to fire Mr. Kaufman? Did you advise so to that effect at that meeting?

Ms. LAVELLE. That is under the Department of Labor. But I can just tell you as a senior manager who has managed a number of people, I would never make such an outrageous statement.

Mr. SCHEUER. Ms. Lavelle, I have in my hand a sworn affidavit executed yesterday by Mr. Richard Campbell who, until his resignation on September 28 of this year, served as Assistant Inspector General for Investigations for the EPA. This statement relates to a meeting that you, Inspector General Novick and Mr. Campbell participated in last March.

I wish quietly to remind you that you are under oath. In order that we could have your most forthcoming and truthful answers, I would ask you to review this document, paying particular attention to the second and third paragraphs.

Let me just read you the second and third paragraphs.

> On or about March 1 1982 there was a meeting in Mr. Novick's Office attended by Matthew Novick, Ms. Rita Lavelle and myself. I attended as the Assistant Inspector General for Investigations, Office of the Inspector General, Environmental Protection Agency (EPA).
>
> During this meeting, Ms. Rita Lavelle asked Mr. Novick to investigate Mr. Hugh B. Kaufman, an EPA employee, for speeches that he has allegedly made that were embarrassing to the Agency. She asked that the I.G. investigate Mr. Kaufman for conflict of interest and check his time cards in relation to his appearances for speechmaking purposes among other things. Ms. Lavelle advised both myself and Mr. Novick that she wished to fire Mr. Kaufman and hoped that we could accommodate her request for an investigation.

That is the end of the quote.

Do you still maintain that you didn't state your wish in the course of that meeting that Mr. Kaufman be investigated so that he could be fired?

Ms. LAVELLE. Mr. Chairman, I would never demand an investigation with a foregone conclusion. Second, I think this affidavit was drawn up—I don't know why—in relation to the Department of Labor appeal. I think to go on with this conversation any further would not do justice to that appeal process, wherein I plan to discuss this.

Mr. SCHEUER. Yes.

Let me just say for the record that the Department of Labor found that there was no previous indication that Mr. Kaufman misused his sick leave and that his explanation for using sick leave was credible, and that you were ordered in this preliminary hearing by the Labor Department to remove any reference to inappropriate behavior from Mr. Kaufman's personnel file and to redo his last performance appraisal which was an unsatisfactory performance that you gave him——

Ms. LAVELLE. Mr. Chairman——

Mr. SCHEUER [continuing]. The first that he had in many, many years of employment with the EPA. You have taken an appeal to that finding of the Labor Department, which is quite proper, quite appropriate, and the absolute right of yourself and that Agency. But I don't want to leave the simple statement on the record that Mr. Kaufman abused his sick leave and that he got a poor performance rating because the Labor Department, after a hearing, found otherwise, and you are appealing that Labor Department finding, which is quite appropriate on your part. But the present record is that Mr. Kaufman is blameless. The affidavit indicates that you requested an investigation and made it transparently clear that you wished to fire Mr. Kaufman.

Do you have any particular response to that?

Ms. LAVELLE. Mr. Chairman, you are alleging that based on information that you have. Obviously, I do not——

Mr. SCHEUER. This is——

Ms. LAVELLE. Are you going to let me finish?

Mr. SCHEUER. Excuse me. The information I have, this is an affidavit by a high-ranking officer of the EPA who was present at that meeting.

Ms. LAVELLE. Who has resigned.

Mr. SCHEUER. That is right.

Ms. LAVELLE. He is no longer with the EPA.

Mr. Chairman, I would like to state for the record that obviously we are appealing this decision because we disagree with the affidavit statement that was made by the Department of Labor.

Mr. SCHEUER. This is more than simply a statement by Mr. Campbell. We have here a letter dated July 23, signed by Mr. Matthew Novick, to Chairman Dingell, the chairman of the Energy and Commerce Committee, in which he states that Rita Lavelle requested the Inspector General open an investigation regarding Mr. Kaufman appearing before the citizens groups, apparently on his own time. The Inspector General declined to open an investigation, advising that he saw no basis for an investigation pertaining to Mr. Kaufman's off-duty activities.

So here we have the written testimony of two top-ranking officials in EPA that you requested investigation of Mr. Kaufman because apparently he was publicly embarrassing the Agency in his criticism of the Agency and the way it was handling Superfund activities before the Energy and Commerce Committee, before the Science and Technology Committee and apparently before private groups, and that you had publicly stated that you wished him fired.

Not to make any more of a controversy out of this than it already is because the matter is in the administrative process, I wish to make it very clear on behalf of this subcommittee of the Science and Technology Committee and also as the ranking member of the Commerce Committee—although I can't speak for Mr. Dingell, I think I can speak for the membership of that committee—that we will not tolerate harassment, we will not tolerate threats, we will not tolerate firing Government employees for making duly authorized appearances before congressional subcommittees and full committees or because they have otherwise taken advantage of their due constitutional rights and freedom of expression. We do not lose our first amendment rights, Ms. Lavelle, because we join the executive branch of the U.S. Government.

Your conduct in this matter provides further evidence, if anybody wished to find it, that you and other Agency officials are bent on destroying EPA's corps of dedicated, highly professional, middle-level managers who carry the brunt of the responsibility for the enforcement programs and the scrutiny of these toxic substance sites, for making a reality out of the patina of the programs that you are administering, and what I would consider the illusion of the enforcement program which you promulgated last July.

It now appears that if you cannot get such employees to depart voluntarily, that you will use any means and every means to have them investigated, embarrassed, harassed, and ultimately fired.

Ms. Lavelle, if you think the American people will accept this pattern of conduct, and if you think the Congress will accept this pattern of conduct, let me say that I think you are badly mistaken. And I believe that you and other top officials of the EPA, including the Adminstrator, ought to engage in an agonizing reappraisal of their staff policies, of the entire spectrum of their staff policies, which have resulted in a flood of resignations of some of the very best people. I feel that you and your colleagues at top levels of the administration are doing the Congress and the American people and yourselves, because you have taken on a grave public trust, I think you are doing yourselves and the rest of us a very grave disservice.

Ms. LAVELLE. Mr. Chairman, do I get a chance to respond?

Mr. SCHEUER. Of course.

Ms. LAVELLE. First of all, you are alleging conduct on my behalf.

Mr. SCHEUER. Just let me——

Ms. LAVELLE. Am I going to be allowed to respond?

Mr. SCHEUER. Yes. But just let me interrupt.

I am alleging conduct that is clarified by a sworn affidavit of an official of the EPA who was present in that room and who was present in this room and who, if you wish, I can call to the table to testify directly on the substance of his affidavit.

Now please proceed.

Ms. LAVELLE. The facts are you still are alleging conduct on my behalf based on the affidavit of one person in a situation which we are disputing with the Department of Labor pursuant to the Administrative Procedures Act.

Second, I do not believe in harassment. If anything, we believe in the first amendment, and certainly we have allowed people to speak out. I think the hearing process has shown that.

Third, I would submit, Mr. Chairman, that the very dedicated employees that you cite and that I am terribly conscious of are the very ones who complained in this matter and who led to the investigation.

Finally, the flood of people supposedly leaving the Agency is less than 1 percent, which is typical of attrition of all prior administrations.

Thank you.

Mr. SCHEUER. Mrs. Schneider.

Mrs. SCHNEIDER. To shift gears for a moment, I have a question that I am concerned with. Right now, as we all know, the Superfund is financed by a fee schedule on chemical companies. However, there is a rumor about that EPA is planning to eliminate the fees next year, based on the assumption that there is already enough money in the Superfund. Is that rumor true or false?

Ms. LAVELLE. Congresswoman, I would be very happy to answer that. That is absolutely false. Our Superfund program has spent 83 percent of the money allocated to us by Congress. We were able to carry over the additional 16 or 17 percent and put it into site cleanup.

The situation which you are asking about is will there ever be a total of $900 million in the fund so as that is when the taxing mechanism stops. The answer is an unequivocal that situation will never exist. We are planning on spending the funds. Indeed, the money that we ask for from Congress, Congress saw fit to cut our request by $30 million. But the facts are the money is there and it will be spent on a very accelerated basis, which we talked about on numerous occasions before this House.

Mrs. SCHNEIDER. Right. You are focusing on the expenditure of those moneys; I am focusing on the collection of those moneys. What you are saying now is the EPA has no intention to stop the collection of Superfund fees next year.

Ms. LAVELLE. No, madam. The only way that could happen—in other words, the collection would stop—if in the fund there is a balance of $900 million. That will never happen.

Mrs. SCHNEIDER. OK.

I was also interested in knowing your opinion about changing, for example, the RCRA fee schedule as it exists right now and to base it on the amount of wastes generated rather than on the amount of chemical feed stock that goes into production. Do you have some feelings on that?

Ms. LAVELLE. The Superfund fee schedule, as you point out, is based on feed stocks as opposed to wastes generated. As a person that has been spending time looking into this, I think it would be more appropriate to put a taxing mechanism on the wastes generated because that would encourage what we all support, namely recycling, recovering of wastes, rather than encouraging disposal of wastes. I have indeed indicated that willingness to a number of State officials who have come to me and said, "If you were to design me a fee system, how would you design it?"

Mrs. SCHNEIDER. How have the different State offices responded to you? Does this proposal seem appealing to them?

Ms. LAVELLE. Very appealing.

Mrs. SCHNEIDER. Can it gain momentum and will EPA lead the charge in changing this kind of fee collection?

Ms. LAVELLE. I can't say that we will lead the charge at this point, but as the senior program manager, that would be my personal——

Mrs. SCHNEIDER. Recommendation.

Ms. LAVELLE [continuing]. Recommendation. And I have communicated that with a number of the States. As I said earlier, States have already developed 22 waste feed systems with 11 more on the boards, and they seem to be going in that direction.

Mrs. SCHNEIDER. The other thing I would like to mention is that we have already held, I guess, two hearings on discussing the regulations that EPA has promulgated. After all of the talk, I asked a concluding question which was, do I feel that the regulations that EPA has put forward provide the greatest possible protection to the public health. And the unanimous answer that I got, the bottom line response, was no.

Now, I need to ask you if everyone, from the Chemical Manufacturers of America to the Environmental Defense Fund to the Office of Technological Assessment, the whole gamut of people say no, then where do we go from here? Where do you go from here and where does Congress go from here?

Ms. LAVELLE. First of all, I would like the opportunity to explain what our regulations do. Pursuant to the purposes of this hearing, if we could take a few moments to do that. To go back to the chairman's triad discussion, we do feel that our D&O standards will work and we would appreciate the opportunity to be able to discuss the regulations, how they are indeed protective of human health and the environment when properly followed.

Mrs. SCHNEIDER. That is a key, when properly followed.

Ms. LAVELLE. Most certainly it is.

Mrs. SCHNEIDER. As I indicated earlier, I am concerned that EPA be asking for adequate funds, both for State grants and for their own administration, their own personnel, to implement that. I am greatly concerned about that. We will be watching ~~very~~ closely to make sure that the budgets are adequate for those purposes. Otherwise, your regulations are useless.

Ms. LAVELLE. We appreciate that oversight and concern, because we are concerned also. However, it is not just dollars, it is how you manage your programs. We have made a number of innovative changes in how we are managing compliance and inspection approaches. We would like to discuss those, and we would be glad to update you on those.

I think two key points need to be made, though, at this point. That is that to submit that banning landfill is the answer is, obviously, we feel not the appropriate submission. But even with alternative technologies, even if we were to assume that alternative technologies were realistically available today, I would like to point out that you still need to landfill and land dispose of the wastes from the handling of those particular technologies—a case in point is incineration—you still have to landfill the ash.

I would hope that we could get into the regulations and discuss what they do and don't do and how they are protective.

Mr. SCHEUER. We would be happy to have you get into the regulations. We presume that was the purpose of your first 15 minutes of oral testimony this morning.

Let me just say on the point that you are dilating on now that we had a very great deal of evidence that the regulations don't provide adequate incentive to use these alternative technologies because they are more expensive than simply dumping on the land. We had testimony that the alternative technologies are viable and are effective, that incineration does work, that detoxification does work, but they cost more. As long as you permit the continued dumping on land at a very, very much lower cost, there is no real incentive for the chemical companies who engage in this more expensive process of detoxification and incineration, and you have a sort of Gresham's law at work of bad money driving out good money, bad processes, bad disposal processes driving out sound disposal processes, because the sound processes can't compete in the marketplace. Therefore, a company, in a time of economic stringency and in a time of limited resources and in a time of grave financial pressures, they inevitably irresistably seek to find the cheap way out of the problem of disposing of their toxic wastes.

And you are permitting them to take a cheap way out, Ms. Lavelle, at a cost that could be 100 times or more more expensive to future generations to try to clean up the tragic awful mess a generation or two generations from now. This is the patrimony that you would seek to pass on to your children and grandchildren and my children and grandchildren.

We think that you have set a whole dangerous congeries of economic forces at work that inevitably tend to downgrade the incentives and the efforts of responsible corporations to do a good job of solid waste disposal, and you are holding out an attractive, cheap, inexpensive form of waste—cheap here and now, but vastly expensive, both in terms of dollars and in terms of very harmful, very serious effects on human health and the environment.

If you wish to go ahead and discuss the regulations, we would be very happy to have you do that.

Ms. LAVELLE. Good, Mr. Chairman.

We are not seeking a cheap way out. If anything, the 22 litigants that are suing us right now on these regulations are saying that the regulations are too expensive.

Furthermore, the chemical industry——

Mr. SCHEUER. Too expensive in relation to what? You say that land-waste disposal can be done with a reasonable margin of safety more cheaply. What is a reasonable margin of safety? Not installing barrier methods that you say in your own preamble won't work. More expensive than what? More expensive in terms of achieving what kind of goals for the American people? This is what we are trying to get at.

We say that the alternative that you would provide at a very cheap dollar value leaves the cost, leaves the lifetime cycle cost of coping with the desperately harmful effects of toxic wastes to future generations. You are ducking the full costs of today's operations. You are ducking the fact that perhaps the most expensive aspect of producing these chemicals, the disposal of toxic wastes—is being laid on a future generation. So, when you say "with a reasonable margin of safety," I would like to know what the reasonable margin of safety is.

None of the witnesses that have testified up to now feel that you are providing a reasonable margin of safety. So we have to be very skeptical.

We would be delighted to have you finish your remarks, and if Mrs. Schneider and I have a question from time to time, we won't hesitate to ask you.

Ms. LAVELLE. Good, Mr. Chairman.

I would like to explain the regulations and what they do, because I think there is a great deal of miscommunication here, and perhaps we can clarify it for you.

John, why don't you take over and get into some of the basic explanations of it.

Dr. SKINNER. The first thing you should understand is that we do ban the land disposal of certain wastes under the regulations, and I can explain what those wastes are in 1 second.

Mr. SCHEUER. Would you tell us which ones?

Dr. SKINNER. Yes. We ban liquids in containers. We ban reactive wastes that are not neutralized before they are placed in. We ban the placement of acidic wastes that are not neutralized before they are placed in the landfill. The second point that I would like to make—we also ban ignitable wastes from being placed in a landfill.

The other point that I would like to make is that even if we banned everything that every one of your witnesses suggested that we ban, there would still be a residue that has to be placed on the land and has to be managed. We think the system that we have set up to manage those residues is the best that technology can produce today.

We agree that additional wastes should be banned in the future, and we will. We have research efforts to identify those wastes. We have a program which we put forth which will in the future prohibit other wastes for various purposes. But even if you do that, you have to manage the ultimate disposal sites safely and completely. We think that we are trying to do that under our current regulatory structure to the greatest extent that we can today.

Mr. SCHEUER. Do you presently plan to ban cyanides?

Dr. SKINNER. Cyanide is a reactive waste. We have banned reactive wastes for over a year now.

Mr. SCHEUER. So further dumping of cyanide——

Dr. SKINNER. Of all reactive wastes.

Mr. SCHEUER. OK. How about halogenated organics?

Dr. SKINNER. In the future, we are studying halogenated organics, and we probably will prohibit some of those from landfills when we complete our studies.

Mr. SCHEUER. When is that likely to be?

Dr. SKINNER. Over the next 18 months.

Mr. SCHEUER. In the meantime, you are permitting them to be land disposed?

Dr. SKINNER. In the meantime, halogenated organics cannot be placed in containers in landfills. If they are liquid and placed in bulk liquid into the landfill, there has to be a leachate collection system which is capable of removing them.

Mr. SCHEUER. Of course, the leachate collection system itself has come under very severe questioning as to the adequacy of the barrier.

Dr. SKINNER. The leachate collection system has to be designed properly, it has to be managed properly. We agree that in the past, this has not been the practice. We think that with good engineering and good design, you can manage the site effectively.

Ms. LAVELLE. Mr. Chairman, I think——

Mr. SCHEUER. How about toxic metals?

Ms. LAVELLE. Mr. Chairman, to return to——

Mr. SCHEUER. Will you hold the phone for just a moment. He is answering my question.

Dr. SKINNER. In liquid form and in containers, they are currently prohibited, as I indicated previously.

Mr. SCHEUER. How about strong acids?

Dr. SKINNER. Strong acids must be neutralized before placement in the landfill.

Jack, would you like to expand on that?

Mr. SCHEUER. That is the current requirement?

Mr. LEHMAN. Mr. Chairman, I think Dr. Skinner just misspoke on that. The current rules do not require acids to be neutralized prior to placement.

However, he is absolutely correct, though, about ignitable wastes, reactive wastes, which include cyanides and sulfides and explosive types of wastes and that sort of thing, and a large number of liquids. So I support what is being said here that we already ban a number of wastes that the State of California has proposed.

Mrs. SCHNEIDER. I would like to say that I find it very disturbing to hear the word "ban" constantly repeated, because it appears to me to be a very unrealistic and archaic approach. I think that what would be much more gratifying to the hearing would be for EPA to say, "Boy, I wish you folks would appropriate adequate monies in science and technology," or wherever is necessary, and perhaps formulate some incentives for industry to get moving on the recycling of these wastes." I don't recall in all of the discussions that we have had here for the past several hours any concern or any emphasis on the need for incentives for recycling.

One of the greatest problems that we have in addition to toxic wastes and their ramifications on the health of the general public is our unemployment situation. It seems pretty clear to me that there are so many opportunities for employment if this country would get moving on a viable effort to recycle many of these hazardous waste and to reuse.

Ms. LAVELLE. First off, Congresswoman, these regulations do indeed provide incentives for recycling. Let me explain that. Though they don't call it out in the letter of preamble or the law itself, they provide direct economic incentives and indirect economic incentives such that a lot of R&D money in private enterprise of major corporations that had waste streams is going into recycle recovery because it is much more economically effective right now.

Mrs. SCHNEIDER. But we are talking about big industry that can afford it. I am interested in small businesses, small jewelry manufacturers, small chemical manufacturers. They cannot afford it. It is much easier for them to put their goodies together and to take them out to some landfill. I am very concerned, having three of the most toxic waste dumps in the country in my own district, to see the fact that when we talk about banning—I mean, does that mean that the pig farmer who is running the local dump is going to be responsible for making sure that various toxic and chemical contaminants are removed or they are chemically altered? I am very concerned about the reality of that coming to pass.

Ms. LAVELLE. That is why we as an agency felt, and are still assured, that properly constructed, properly managed and properly closed landfills as a technology is a very much needed technology in today's society as we exist right now, mostly because of the good point you made with the small generators. It is a viable available technology to them. It is one that they will employ.

If we cut it off, if we cut off access to this technology or any other type of technology prematurely—which is what the action proposed we feel would do—we will be actively encouraging midnight dumping. We cannot afford to do that. I know that no members of this committee would even try to propose that.

Mr. SCHEUER. I would like to interject a point there.

Ms. LAVELLE. Sure.

Mr. SCHEUER. I don't think our Government—that is both the Congress and the EPA—can afford to go ahead under the pressure that, if we don't provide a very, very cheap form of disposal of solid wastes, midnight dumping is the alternative. That is a police matter. That is a criminal act under clear criminal statutes in our country. We have to rely on the law-enforcement agencies of our country to prevent these criminal acts.

I think we have to lay aside that matter and decide on how we can most effectively dispose of toxic wastes in the most cost effective fashion possible that will adequately protect the economic health of the corporation, of the corporate community, and will adequately protect the health and environment of America and American citizens. I am not going to be put under the gun as a Member of Congress, and I don't think you should be put under the gun, Ms. Lavelle, by the threat of the corporate community—

> Well, if you don't give us a way of doing this very cheaply that is legal, we are going to do it very cheaply in an illegal fashion.

I cannot believe that you or the heads of your Agency or that we in Congress are going to knuckle under to that kind of blackmail. I can't believe that a responsible member of the corporate community would even allege that threat. I think we have to let the law enforcement people do their job, and then we have to do our job.

I think it is up to us to find a way of disposing of solid wastes, an institutional structure that will produce a means of disposing of solid wastes that is minimally expensive, provides the least burden on the corporate community, but that also adequately protects the health of the American people.

Ms. LAVELLE. Mr. Chairman, the situation that Congresswoman Schneider was bringing up, the situation of the small generator—I haven't had a chance to talk to you on this matter—but there are 690,000 small generators in this country that we have immediate knowledge of that, frankly, need to deal with properly and environmentally and effectively disposing of their hazardous wastes. We cannot have a policeman on every corner trying to insure that these small businesses—and we are talking about hospitals, schools, drug stores, the good jewelry business of Rhode Island, all of them have hazardous wastes. You and I in our homes have hazardous wastes. That is currently excluded under RCRA and goes to subtitle (d) facilities and municipal dumps.

But my point is that our approach is to actively insure the technology that is being employed is protective of human health and the environment. That is what we wanted to discuss today. We feel these regulations that we have come up with, through the D&O standards that they require, as well as the management requirements that they put on the management of these facilities, are indeed protective of human health and the environment. I think that is our appropriate role.

Mrs. SCHNEIDER. What research does EPA have ongoing now to promote alternative technologies? What is the R&D doing?

Ms. LAVELLE. About 50 percent of our R&D budget in hazardous wastes is devoted to alternative technologies.

Mrs. SCHNEIDER. Could you give me a figure of about how much money that is approximately? I don't need the exact figure.

Ms. LAVELLE. It is about $2 million worth right now.

As you are aware, Mrs. Schneider, some of that was related to the incineration standards that we also came out with this year.

Mrs. SCHNEIDER. I would be concerned to know if the bulk of that is going for incineration purposes or if it is going for R&D for alternative technologies.

Ms. LAVELLE. What it is going for is to insure that when the private sector brings us an alternative technology, we can insure that that particular technology is indeed protective of human health and the environment. We have a number of ongoing efforts in that area.

Right now, as we pointed out earlier, incineration is becoming popular. Bio treatment and physical treatment, maybe Dr. Skinner could elaborate on that, because I think this is an important point for the record.

Dr. SKINNER. The figures on the research and development for alternative technologies are as follows: thermal destruction of organic hazardous wastes through incineration is about $2.6 million; cofiring of solid wastes, hazardous wastes, in boilers and cement kilns is about $1.2 million; other advanced techniques, such as molten salt, plasma, that are also being investigated, about $140,000; and then physical, chemical, biological and other types of treatment, $150,000. That is the fiscal year 1983 research and development budget.

Mrs. SCHNEIDER. OK.

Ms. LAVELLE. As we announced in the Federal Register, we are planning our R&D programs to support our regulatory impact analysis work over 1984 and on. This is going now toward alternative technologies.

Dr. SKINNER. Let me point out one other very important expenditure, and that is for pretreatment processes that make the hazardous wastes nonhazardous through fixation and encapsulation, about $300,000 a year we are spending on that.

Mrs. SCHNEIDER. Have you measured landfill versus the recovering and done a cost-benefit analysis? Have you measured the two on that basis?

Ms. LAVELLE. That is part of our regulatory analysis work that we are doing right now. We are examining a total of 17 different technologies and doing a cost-benefit analysis on those.

Mrs. SCHNEIDER. When will that be completed?

Ms. LAVELLE. 1984.

Mrs. SCHNEIDER. 1984? Yet, in your testimony, you are saying that the landfills are the most economical. How can you say that when you haven't done a comparative analysis?

Ms. LAVELLE. We are saying that in the real world the landfills still are the most economical in terms of if you have a drum of waste and you want to dispose of it, what are the costs.

Mrs. SCHNEIDER. Yes.

Ms. LAVELLE. These are changing. Our regulations have had a major impact on increasing the costs. We are trying to measure those. We obviously projected what those increases would be before we came out with the regulations. There is going to be—and indeed it is already changing—an increase in costs to landfill.

Mrs. SCHNEIDER. But we are not talking about necessarily the here, the now, the short-term, the quick fix, the band-aid approach; we are talking about the long-term solving of this problem. And it seems to me that to have a study in 1984 is ridiculous—for us to say landfills are most economical now. They will continue being most economical until EPA can prove or desires to prove otherwise. That, in itself, doesn't provide any incentive. I mean, here we look at cost-benefit analysis.

Ms. LAVELLE. We will be coming out with reports from now until 1984 along a schedule that we announced 2 days ago that address the economic constraints and incentives. This will be a study of how the real world economics is indeed working. The agency does not pull economic reality out of the world. That is what this whole study is about.

Mr. SCHEUER. Real world economics is amply evidenced in such horror stories as Love Canal, Kepone and maybe several thousand like episodes across the country. We know what real world economics performs in the area of toxic waste disposal. We are trying to change those economics. We are trying to create some economic incentives to promote adequate, cost effective disposal of toxic wastes.

Our complaint that both of us are voicing, perhaps in different words, is that so long as you are permitting very inexpensive disposal of toxic wastes by land, it is simply economically impractical and not doable for a responsible corporate director or decision-maker to go to a vastly more expensive process of disposal by some of the alternative technologies, such as incineration and detoxification.

What we think you ought to do, just in case the message hasn't come across sufficiently clear, is to suspend further dumping of the most toxic of the toxic wastes until such time as you have finished these studies which may or may not justify—and I am using your own words—the wisdom of the regulatory actions which you took earlier this year.

Ms. LAVELLE. Mr. Chairman, as Dr. Skinner pointed out, we are indeed banning wastes already. We are leading the Nation in that regard. We are banning specific wastes.

Mr. SCHEUER. The State of California has done a great deal better than that.

Ms. LAVELLE. Well, I would like to discuss the State of California's plan with you.

Mr. SCHEUER. Good. Let's do that.

Ms. LAVELLE. Perhaps what we could do at this point, though, before we get into that—I think that is very important for the record—I would like to have Mr. Lehman discuss with you some of the economics that we found out that are indeed going on there, and point out that the Love Canal and all those situations that you alluded to, the alternative technologies are just becoming available. It is our responsibility to insure that whatever technology is brought to the marketplace, it is indeed protective of human health and the environment. That is our driver.

Jack.

Mr. LEHMAN. Congressman, if I may, I think your point is well made that, prior to the evolution of the RCRA hazardous waste regulations, the disposal of hazardous waste was in fact very cheap to the land. We are talking, in terms of in the 1950's and 1960's and early 1970's, $1 to $5 a ton, in that range. That, in fact, has led in the past to horror stories such as Love Canal, and so on.

Since we published our regulations in 1980—and these are now 1981 figures—the cost of landfilling hazardous wastes has gone up to between $20 to $80 a ton from $1 to $5. That is based on the interim status regulations. Now we project that the costs to the owners and operators of land disposal facilities will, based on our July 1982 rules, be twice as expensive as the interim status was. So we project that the cost will double again as a result of the implementation of these rules in July. So, we are now talking, if that is true, in the order of, let's say, $40 to $160 a ton You have to bear in mind that they now have to take into account their future liabilities in terms of potential for cleanup, and so on, which could be very expensive.

Meanwhile, the relative costs of alternative technologies, while they are as a general matter higher than landfilling—and we agree with that—the relative costs of these two types of management has been decreasing. In other words, the cost of landfilling has been increasing very rapidly. The others have been increasing also because incineration costs, for example, are keyed to the cost of energy. So those costs have been going up. But other types of pretreatment, such as chemical fixation, are currently running—and these are 1981 numbers—in the range of $20 to $100 a ton.

Mr. SCHEUER. Thank you.

Mr. LEHMAN. These are in the same range as landfill costs before we add the doubling costs by these current regulations.

Mr. SCHEUER. Thank you.

Mrs. Schneider.

Mrs. SCHNEIDER. One other cost that I am real anxious to get to is that the CERCLA regulations require that the owners and operators of closed hazardous waste sites are released from any future liability after 5 years if they can show that they have been complying with the permit and they can demonstrate that there is no likelihood that their particular sites pose any hazards to public health.

At that point, after 5 years, liability is transferred, as you know, to the public closure liability trust fund. What I am real anxious to know is that, after that 5 years has passed, no one knows who is going to be paying for the contamination problems and how costly those problems will be. Where is that money going to come from, first of all, for that trust fund?

Ms. LAVELLE. OK. Congresswoman, you point out very well an inconsistency in the CERCLA law and the RCRA regulations as we promulgated them. We feel that we have errored on the side of being more strict.

Could you explain that one, John?

Dr. SKINNER. Yes. Under our regulations, the responsibilities of the owner and operator of the facility extend beyond the 5-year period that they do under the CERCLA law. They extend for a minimum of 30 years, and that 30 years can be extended based upon what that monitoring finds during that period. That is obviously something that we have to reconcile with the CERCLA law. I believe we have a report to Congress due next year which will address that issue.

Ms. LAVELLE. Second, the 30-year period—you say why 30 years, why not 100, why not 1,000—the 30-year period is very consistent with the D&O standards that we have called for in this regulation, wherein at worse-case estimates, we assume that there will be plume formed in the first 5 to 7 years. That goes back to this liquid management approach that we wanted to get into and discuss today.

Mrs. SCHNEIDER. Why is EPA allowing the liability to be transferred away from the owners and operators?

Dr. SKINNER. It is the fund that allows that. It is the CERCLA law.

Mrs. SCHNEIDER. I understand that.

Ms. LAVELLE. The CERCLA law does, not EPA. In fact, we increase liability, if you think about it and with what Dr. Skinner just said, in what we announced in our regulations.

Mrs. SCHNEIDER. Who is going to be paying for the cleanup of the ground water after the 30-year period?

Ms. LAVELLE. OK. Why don't you explain that.

Dr. SKINNER. If the facility is designed properly, if it is monitored properly over a period of time, we expect that the probability of requiring cleanup in the future will be very, very small. We can't guarantee that there will be zero probability. No one can.

Mrs. SCHNEIDER. I realize that. But you are not answering my question. You are working under the assumption that there won't be a problem.

Let's work under the other assumption, that there is a problem, that there is ground water contamination, and the law provides for a set number of years. What happens after that number of years and we have——

Dr. SKINNER. If there is any evidence within the 30-year period that something is occurring, you can extend the liability for that period of time that compliance monitoring is necessary. Obviously, someone could escape that. There is no question of that. And at the end of some period of time, they could escape responsibility under RCRA.

Mrs. SCHNEIDER. So, what do I do if I live near the site and my ground water is contaminated? Who is liable?

Dr. SKINNER. They still might have liability under common law or under State law for their actions.

Ms. LAVELLE. More importantly, we are calling out for D&O standards in these regulations so that that will not be the case. If we have learned anything, we have learned how plumes are formed, where they are formed, and how they migrate through aquifers and where we should set up our monitoring such that we can immediately detect a plume being formed. We feel and we argue within the regulations that this will occur in the first 5 to 7 years when you have a viable party. Automatically, if the problem occurs, the compliance period of 30 years is automatically extended.

Mrs. SCHNEIDER. OK. The thing that concerns me is that, in some of the testimony that we had last week, Mr. David Miller stated that the cost for the cleanup of the severely contaminated ground water aquifers could range from $5 million to hundreds of millions of dollars, possibly taking decades to clean up and, in many cases, restoration is simply not feasible. Mr. Miller recommended that, because of these reasons, many contaminated ground water sources will have to be written off.

It is easy to say, but what about the people who are dependent upon that source of water? And when one recognizes that through the natural process, much of our ground water is being depleted, and the other part that isn't being depleted is becoming contaminated, the bottom line is who is going to pay? If you have a one or a two-word answer, I would really appreciate it.

Dr. SKINNER. Can I make two points in that regard? The first is, to allude the types facilities that we are talking about, to compare them to Love Canal and facilities in the past that have contaminated huge expanses of ground water, I do not think is a valid comparison.

Mr. SCHEUER. OK.

Dr. SKINNER. Could I make my second point?

Mr. SCHEUER. No. We have to suspend for about 12 minutes for this rollcall vote, and you will immediately be recognized.

Dr. SKINNER. Thank you.

[Recess.]

Mr. SCHEUER. The subcommittee hearing will commence.

Mrs. Schneider will not be able to rejoin us. She is meeting with the chairman of NOW, the National Organization for Women.

Ms. LAVELLE. Maybe I should go visit.

Mr. SCHEUER. Pardon me?

Ms. LAVELLE. Maybe I should go visit.

Mr. SCHEUER. OK.

Dr. Skinner, I interrupted you in order to get to the rollcall vote. Please proceed.

Mr. SKINNER. Thank you very much, Congressman.

I was responding to Congresswoman Schneider's point about the long-term care of these facilities and who is responsible and the concern that a larger expanse of ground water could be contaminated and would be very expensive to clean up.

The first point that I made was that there should not be a comparison between these facilities and Love Canal and the other bad facilities of the past. These will be engineered facilities; they will keep things out—which we can go over again and describe what is kept out—they will be kept dry; they will be isolated through liners and caps and a redundant management system; they will be monitoring very close up, so if there is any contamination, it will be found right away. This should reduce significantly the potential for contamination of large amounts of ground water.

There is monitoring during a 30-year period at least, and it can be extended. If, after that 30-year period, there is contamination, the Congress has established the post-closure trust fund under CERCLA which provides the funds for cleanup of those facilities if it, in fact, is needed. There needs to be an institutional arrangement which preserves long-term care of these facilities, and that is the basic arrangement that has been established by Congress under law.

Mr. SCHEUER. Ms. Lavelle.

Ms. LAVELLE. Mr. Chairman, I would hope that we could return to the question earlier that the Chair asked of us which we were not able to complete the answer to. Namely, that was you asked what indeed do you ban if you ban? You wanted us to run a comparison between us and the California plan. I would like to supply that for the record because I think that is a very good point.

Mr. SCHEUER. All right. Let me ask you for the record—we had testimony from S. Kent Stoddard, director of the toxic waste assessment group in the Governor's Office of Appropriate Technology out in California. He testified to the need to restrict certain hazardous wastes from land disposal because of their toxicity, their mobility and their persistence. His testimony was supported by many industrial and environmental witnesses.

Every single witnesses who appeared before this committee in the last several weeks voiced their support of California's recently adopted regulations, of which I am sure you are familiar, which, in effect, ban the land disposal of five categories of toxic waste: The cyanides, toxic metals, strong acids, PCB's and the halogenated organic compounds.

I assume that you are familiar with the California plan, and I would like to ask whether you support it? Do you support the California plan?

I would further ask, since you are hesitating—he who hesitates is lost around here.

Ms. LAVELLE. I am finding that out.

Mr. SCHEUER. Is EPA planning to ban these same and other wastes from all landfills across the country?

Ms. LAVELLE. Good. Mr. Chairman, we would like to answer that somewhat in depth. First of all, we support in principle the premise of the California plan and, in fact, have been ahead of them somewhat in proposing banning of certain wastes. We would like to discuss that at this point.

Dr. SKINNER. Certain aspects of our program are very analogous to California, and we fully support those aspects because we do the same thing and, in some instances, even more than they do. There are some differences that we will work on, and perhaps we will adopt their approach in all areas.

Let me make a couple of points about the California plan. First of all, currently, today, they do not ban any of these wastes from landfills. All of these prohibitions will go into effect either next year or in 1985. The most difficult ones, the halogenated organics, the ones that we have the most difficulty with in sorting them out and deciding which ones to prohibit, go into effect in 1985 in California.

Currently, California does not prohibit the placement of liquids in drums in landfills. They do not prohibit that. We have prohibited that for the past 8 or 9 months. It is my understanding that they will prohibit that early next year, and we encourage them to do that. It is a very good policy.

We went through before the types of wastes that we prohibit from landfills, reactive wastes. Let me clarify the point on strong acids, because there was some uncertainty on that. Strong acids can only be placed in landfills under our regulations if they are compatible with the liner or if they are compatible with other wastes. If they are not compatible, they have to be neutralized or they can't be placed in the landfill. So, cyanides, reactive wastes, wastes that cause fires, wastes that cause explosions, wastes that might erode the liner, wastes that may interact adversely with other wastes are all banned under our current regulations today.

We will look at heavy metals and we will look at halogenated organics, and we may reach some conclusions about them. I think our conclusions will be that certain classes of them, based upon their properties, will make them candidates for prohibition, and then we will move with regulation to do that.

Mr. SCHEUER. Could you for the record elaborate on your feelings on your appraisal of the California plan and all of its aspects? We will hold the record open for 1 week or 10 days to give you plenty of time to do that.

Ms. LAVELLE. We would be happy to do that, Mr. Chairman.

[The information was never received.]

Mr. SCHEUER. You stated that the public doesn't accept the siting of hazardous waste incineration, recycling, or other treatment facilities in their neighborhood.

It seems to me that the acceptance of the California plan and the success of the California plan proves the contrary. You must be aware that California, between the State and the municipalities, they have permitted six new alternative waste management facilities to be licensed and constructed during the last year, most of them without any public opposition.

Wouldn't you say that the California experience indicates that the public is more willing to accept sophisticated, safe, high-technology facilities for the disposal of toxic wastes? Doesn't it also suggest that industry now, since they have enlarged the ban on ground disposal, that that makes it more likely that industry will be ready and willing to make investment in safe technologies to reduce, recycle, treat, and destroy hazardous wastes, as industry is now appearing they are willing to do in California? Doesn't the experience of California, doesn't the success of these new applications prove that the California plan is valid and that it is working and that the public does accept high-technology alternative means of disposing of toxic wastes?

Dr. SKINNER. Perhaps they do. We have had experiences where they have opposed incinerators, we have had experiences where they have opposed treatment facilities, we have experiences where they have opposed chemical and biological facilities as well. I don't think the public wants any type of hazardous-waste facility near them.

Maybe there is some differentiation between high-technology approaches and landfill approaches, but there is still considerable opposition.

Mr. SCHEUER. There is still the distinction that I am trying to make. When you go to a high-technology solution that they feel provides safe, and sound, and reliable methods of toxic waste disposal that will protect their health and protect their local environment, the public accepts it. They like that a hell of a lot better than land disposal which they know, and which the civil, community, and environmental leaders are telling them, do not provide reliable containers for the toxic wastes, that the integrity of the separation system simply cannot be relied on. They have heard this from a whole variety of environmentalists and scientists of the kind that we have heard in the last 3 or 4 weeks. Apparently they have come to believe that landfill doesn't protect but that the high-technology approaches do protect them, and they seem to be willing to buy it.

Dr. SKINNER. One other point that I would like to make——

Mr. SCHEUER. Isn't that the message of the California experience?

Dr. SKINNER. I think that that is their feeling. I think that prohibiting wastes from landfills and encouraging other technologies where that is appropriate is something that we have encouraged and supported throughout the years.

But you have to have the other side of that. For that wastes that have to be land disposed—and Mr. Stoddard when he was here last week acknowledged that waste will have to be land disposed—there has to be a well engineered and managed site. I predict that California will have to adopt a set of regulations very, very close to ours for those remaining wastes that are placed on the land.

Mr. SCHEUER. I agree with what you have said. I think that is a very sound and well thought out position.

Ms. Lavelle, anything else? The hour is late and you have been very, very patient.

Ms. LAVELLE. Perhaps, Mr. Chairman, if you would allow, as we discussed earlier, we would like to supply some more technical discussion as to what these regulations would and would not do.

Mr. SCHEUER. Without objection, so ordered. We will hold open the record for another 10 or 12 days. If you need a few more days, please let us know.

Ms. LAVELLE. Thank you, Mr. Chairman.

Mr. SCHEUER. And we may submit some additional questions in writing for the record.

[The information was never received.]

Ms. LAVELLE. Thank you.

Mr. SCHEUER. Do you wish to round out your testimony or add anything now that you think hasn't been sufficiently touched on?

Ms. LAVELLE. Just to say in summation, Mr. Chairman, that the Agency continues its commitment of protecting human health and the environment and is committed to developing the regulations necessary to insure that that is a real situation.

Mr. SCHEUER. We have heard your words.

Ms. LAVELLE. We are going to prove it with results in this coming year.

Mr. SCHEUER. I fervently hope that you do. We would like to have the results of these tests and studies that you are conducting over the next 18 months that presumably will prove or disprove the wisdom of your regulation activity earlier this year. We will maintain close contact with you, both formal and informal.

While we are skeptical of some of the things that you have done and some of the acts that have taken place in the agency, we certainly hope that you will prove us wrong. If we have been doubting Thomases here on the Hill, we fervently hope that you will prove us wrong. This Congressman will be the first one to apologize if you do prove us wrong and if you show that our skeptism was unjustified.

Any further comment from any of the witnesses?

Ms. LAVELLE. No, thank you, Mr. Chairman.

Mr. SCHEUER. You have been here over 3 hours, and you have been very, very patient. We thank you for your attention.

The meeting is hereby terminated.

[Whereupon, at 12:28 p.m., the subcommittee was adjourned.]

APPENDIX I

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Henry G. Williams
Commissioner

FEB 25 1983

Subcommittee on Natural Resources
and Environment
Room 817
House Annex #1
U.S. House of Representatives
Washington, D.C. 20515

In accordance with your February 23 telephone conversation with Mr. Paul Counterman of my staff, I am sending you copies of various documents concerning New York State's efforts to ban the landburial of selected hazardous waste, namely,

1. Assembly Bill 437-D, passed by the New York State Assembly but not the Senate;
2. A study element titled "Selective Ban on Landfilling" from the New York State Short-Term Hazardous Waste Management Plan dated April 1, 1982;
3. Operation Permits for CECOS International, Inc. (see Operation Permit for Secure Chemical Management Facilities #4 and #5, special conditions #2 through #13, #18 and #30);
4. Operation Permits for SCA Chemical Services, Inc. (see Operation Permit for SLF #10, special conditions #8 through #17, #22 and #35).

We strongly support national efforts to limit the landburial of hazardous waste. If we can be of any further assistance, please feel free to contact me at (518) 457-6603 or Mr. Counterman at (518) 457-3273.

Sincerely,

Norman H. Nosenchuck, P.E.
Director
Division of Solid Waste

Enclosures

cc: w/o enclosures: Paul R. Counterman

DEC
PUBLICATION
Division of Solid Waste

New York State Short-Term Hazardous Waste Management Plan

Final Report—April 1, 1982

For Submission to the New York State Legislature

Pursuant to
Article 27 Title 9
Environmental Conservation Law

New York State/Department of Environmental Conservation
50 Wolf Road • Albany, New York 12233
WM P37 (6/82)

STUDY ELEMENT #3 - SELECTIVE BAN ON LANDFILLING

STUDY ELEMENT #3

To develop a policy to ban landfilling of certain wastes and a workplan to prepare regulations for implementing the selective ban policy.

PROBLEM SYNOPSIS

Secure landburial (landfilling) is not an appropriate technology for many wastes and is not the optimum technology for the disposal of others. Secure landburial facilities must be monitored and maintained for long periods of time to prevent environmental releases. Additionally, an irretrievable commitment of land resources results when hazardous waste is buried. Certain hazardous wastes can be acutely toxic, are suspected or known human carcinogens, and are persistent and highly mobile in the environment. The accidental release of these wastes from a disposal facility could create a long-term threat to human health and the natural resources of the state; surface water and groundwater could be especially susceptible to pollution from landburial facilities.

Practicable technological alternatives to landburial of certain organic and inorganic hazardous wastes presently exist when environmental, economic and social factors are given consideration. Some preferable technological alternatives are incineration, neutralization, fixation or chemical detoxification because these provide a higher degree of protection to the public health and the environment.

PROGRAM

It is Department policy to minimize the volumes and types of wastes being secure landburied. The purpose of this element of the Short-Term Hazardous Waste Management Plan is to investigate the need for, feasibility of, and regulatory approach for a selective ban on landfilling of certain hazardous wastes.

There are two related parts to this program: (a) preparation of a detailed draft Department Policy that would be used by Central and Regional DEC personnel in the issuance of permits for hazardous disposal facilities and (b) preparation of a work plan for developing necessary regulations, including the estimated manpower and necessary funding to develop such a regulation and an accompanying environmental impact statement and regulatory impact statement.

The draft Department Policy statement incorporates current toxic waste landfilling bans and other restrictions that are presently applied to secure landburial operations in the State of

New York. This draft policy encompasses recent Commissioner's Decisions on permit applications for secure landburial facilities.

Work plan execution would culminate in the promulgation of regulations banning the landburial of certain wastes. The work plan includes manpower estimates, time schedule, and funding needs. This work plan cannot be implemented until the Department receives additional resources (i.e., for staff and funds for consultent services).

The Department will continue to support the proposed Article 27, Title 15 (Assembly Bill 4375) which bans the landburial of certain named hazardous waste and requires the Department by January 1, 1984 to promulgate regulations banning the landburial of additional hazardous waste. Because of the year lapse since the initial drafting of the Title, the times specified in the proposed legislation need to be extended by one year. More importantly, without additional resources (for staff and consultant services) the intent of this legislation cannot be met by the Department.

A. Draft Department Policy Statement on Landburial of Hazardous Waste (Undergoing final Department review).

Introduction

Secure landburial (landfilling) is not an appropriate technology for many hazardous wastes and is not the optimum technology for the disposal of others. Secure landburial should be used only for those hazardous wastes for which secure landburial has been shown to be environmentally sound and for which no other means of treatment or disposal is feasible. Incineration, neutralization, fixation, chemical destruction and other means of treatment are preferable to landburial because they afford better long-term protection of human health and the environment. Of greatest concern are wastes that contain chemicals which (1) are environmentally persistant, (2) have high environmental mobility, particularly in a soil environment, (3) are human carcinogens, (4) are very highly toxic to humans, plants and animals, or (5) possess highly hazardous physical properties, such as explosiveness or low flash points.

Prohibitions

Hazardous Wastes which possess any one of the following characteristics are to be prohibited from being land buried in chemical waste landfills:

(1) No wastes with a flash point of less than 80 degrees F are permitted.

(2) No wastes or waste mixture that possess a National Fire Protection Association (NFPA) Reactivity Hazardous Rating of 3 shall be placed or created in a chemical waste landfill.

(3) Waste materials containing radioactive isotopes, explosives, shock sensitive or pyrophoric substances are not permitted.

(4) Wastes that are known to possess the chemical or physical-chemical ability to penetrate the clay and synthetic membrane liners used at a particular facility and those wastes which when combined are known to produce a mixture with this property are prohibited.

(5) Hazardous wastes, other than highly dilute spill clean up debris, which contain any of the organic substances listed in 40 CFR 261.33 (e) are to be prohibited from being landfilled after January 1, 1985.

(6) No wastes from which natural biological activity may create chemical products, other than methane, having a NFPA Flammability Hazard Rating of 3 or greater are permitted.

Permit Conditions

Where necessary, the prohibitions above shall be incorporated in permit conditions for all secure landburial facilities. The following additional requirements shall be addressed in all permit applications and reflected in permit conditions.

(1) A waste material containing any specific organic compound in concentrations in excess of five (5) percent by weight or exceeding an amount of 100 pounds for that compound for the entire landfill, that is designated as "highly toxic" by the Condensed Chemical Dictionary, Hawley, Gessner, G., Ninth Edition, Van Nostrand Reinhold Co., or labeled with a "severe toxicity" rating of high by any route in Dangerous Properties of Industrial Materials, Sax, Irving, Fifth Edition, must have supplemental approval from the Department prior to that waste's disposal.

(2) A waste containing any organic chemical designated by OSHA as a carcinogen, in concentration in excess of 2 percent by weight, or exceeding a total of 100 pounds of that carcinogen within the entire landfill must have supplemental approval from the Department prior to that waste's disposal.

(3) If a practical alternative method of processing, reclaiming, or destruction becomes available for a

specific waste, the Permittee shall pursue with the Department the feasibility of using such an alternative method. If a method of destruction becomes available for a specific waste of long-time concern, the Department may withdraw approval to landfill that waste.

(4) All wastes are to be fixed or solidified prior to disposal to the maximum extent feasible in a manner warranted by the character of the wastes and the mode of disposal. All permit applications, to be complete, must fully justify the degree or type of solidification or fixation applicable to each waste or class of waste.

(5) All permit applications must address the solubility of all wastes. The solubility of heavy metals (cadmium, chromium, etc.), of pseudo metals (arsenic, antimony, bismuth and phosphorus), and of selenium, tellurium, and beryllium must all be addressed. A permit condition equivalent to Special Condition C.12. for SCMF #4 of CECOS International, Inc. (Permit #2561) shall be placed in all permits.

B. Final Workplan for the Development of Regulations

The following is a general scope of work to be undertaken by the Department in conjunction with consulting engineering firms to develop and promulgate new regulations that would phase in a ban on the landfilling of specific hazardous waste.

In order to proceed with the work plan, especially the ultimate goal of developing a reasonable and workable draft regulation, significant funding must be provided. A manpower resource and cost estimate to accomplish the work plan includes: a $100,000 private consultant contract, additional NYSDEC staff at a cost of $80,000, and printing and travel costs at $15,000. The products of the work plan can be delivered by January 1984, if the above funding is immediately forthcoming to allow NYSDEC to retain a qualified consultant and hire necessary technical staff.

I. Waste Evaluation

(1) For each unique waste identified in 6NYCRR Part 366, an analysis of the following factors must be undertaken:

a) Environmental persistence;
b) Environmental mobility, particularly in soil
c) Human carcinogenicity;
d) Degree of Toxicity to humans and other living things (ecosystems);
e) Hazardous physical characteristics; and
f) other important factors.

(2) Based on the above factors, wastes shall be categorized into four groups ranging from high priority (requiring immediate banning) to low priority (those for which secure landburial would remain environmentally acceptable).

II. Volumetric Determination

(1) The volume of each type of hazardous waste generated, treated or disposed in New York State would be determined.

(2) The total volumes in the four groups identified in Paragraph I (2) above would be determined.

III. Current Management Practices and Treatment Capacity

(1) The current management practices for each type of waste will be determined. Within the four priority groups (Section I (2)), waste volumes would be totaled by type of management practices; i.e. the volume of waste incinerated, of waste landfilled, etc., would be determined within each priority group.

(2) The wastes within each of the top three priorities would be put into subgroups based on treatment options. The best treatment and method for each waste would be determined. The total volumes generated or treated in New York State would be determined for each subgroup.

(3) The available types of treatment and treatment capacities at existing and proposed treatment facilities would be determined and applied to the above best treatment alternative.

IV. Regulation Development

Draft regulations banning the landfilling of hazardous waste will be developed. A specific date will be set by which each priority group of hazardous waste is to be banned.

V. Development of Draft Environmental Impact Statement

A draft Environmental Impact Statement for the above proposed regulations would be developed to describe and evaluate the beneficial and adverse effects resulting from implementation of a selective ban on landburial of certain hazardous wastes.

VI. Draft Regulatory Impact Statement

A draft Regulatory Impact Statement for the above regulations would be developed to assess, among other factors, the need, benefits and economic impact of promulgation.

VII. Promulgation/Public Participation

The draft regulations would undergo formal regulatory review including public hearings. This would result in the adoption of final regulations by the Commissioner of Environmental Conservation.

VIII. Regulation Review

After promulgation, these regulations would be periodically reviewed. Wastes which are added to the hazardous waste listings would be subject to this review process and added to the banning regulations as appropriate. When new information becomes available about hazardous waste already considered in the banning regulations, the requirement for that waste would be re-evaluated.

STATE OF NEW YORK

437-D

Cal. No. 9

1981-1982 Regular Sessions

IN ASSEMBLY

(Prefiled)

January 7, 1981

Introduced by M. of A. NEWBURGER, HINCHEY, PILLITTERE, YEVOLI—Multi-Sponsored by—M. of A. BIANCHI, CONNELLY, HARENBERG, HOCHBRUECKNER, HOYT, KOPPELL, LEVY, ORAZIO, E. C. SULLIVAN—(at request of the Department of Law)—read once and referred to the Committee on Environmental Conservation—reported and referred to the Committee on Codes—reported and referred to the Committee on Ways and Means—reported from said committee with amendments, ordered reprinted as amended and placed on the order of second reading—advanced to a third reading, amended and ordered reprinted, retaining its place on the order of third reading—recommitted to the Committee on Environmental Conservation in accordance with Assembly Rule 3, sec. 2—reported from said committee with amendments, ordered reprinted as amended and placed on the order of second reading—advanced to a third reading, amended and ordered reprinted, retaining its place on the order of third reading

AN ACT to amend the environmental conservation law, in relation to the cessation of disposal of certain hazardous wastes by land burial

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Legislative findings. The legislature hereby finds that:

1. Land burial of certain hazardous wastes presents an intrinsic, perpetual threat to the health and welfare of the people of this state and to the state's natural resources; in particular, to the state's groundwater and surface water, which constitute irreplaceable resources, critical to the public health and general well-being of the people of the state.

2. Presently existing technology makes alternative methods of disposing of many organic and inorganic hazardous wastes practicable, when environmental, economic and social factors are considered together. Some

EXPLANATION—Matter in italics (underscored) is new; matter in brackets [ ] is old law to be omitted.

LBD2-39-27-387D

alternative means of hazardous waste disposal, including but not limited to incineration, neutralization and fixation, are preferable to land burial because they afford a higher degree of protection to the public health and environment of this state.

Therefore, it is the purpose of the legislature to prohibit the burial, in landfills or elsewhere, of certain enumerated organic and inorganic hazardous wastes by a certain date.

§ 2. Article twenty-seven of the environmental conservation law is amended by adding a new title fifteen to read as follows:

TITLE 15
DISPOSAL OF HIGH PRIORITY HAZARDOUS WASTES

Section 27-1501. Definitions.
27-1503. High priority hazardous wastes; identification.
27-1505. Cessation of certain hazardous waste land burial.
27-1507. Certification of exemption.

§ 27-1501. Definitions.

As used in this title:

1. "High priority hazardous waste" means a hazardous waste as defined in subdivision three of section 27-0901 of this article, which is included on the list of hazardous wastes promulgated pursuant to section 27-0903 and is also included on the list contained in subdivision one of section 27-1503 of this title.

2. "Person" means an individual, trust, firm, joint stock company, corporation (including a government corporation), partnership, association, state, municipality, commission, political subdivision of a state, interstate body or any other legal entity whatsoever.

§ 27-1503. High priority hazardous wastes; identification

1. The following hazerdous wastes shall constitute high priority hazardous wastes:

a. Materials containing the following specific chemical species [illegible] fixed in a low leach rate matrix, in excess of one-tenth of one percent by weight measured prior to addition of any solid or liquid material which would reduce the concentration of the contaminants:

(1) Aldicarb.
(2) Aldrin.
(3) Aluminum phosphide.
(4) Ammonium picrate.
(5) Arsenic acid.
(6) Benzidine.
(7) Bis (chloromethyl) ether.
(8) Carbon disulfide.
(9) Cyanogen.
(10) Cyanogen chloride.
(11) Dieldrin.
(12) Endosulfan.
(13) Endrin.
(14) Heptachlor.
(15) Mercury fulminate.
(16) Nickel carbonyl.
(17) Nitroglycerine.
(18) Phosgene.
(19) Sodium azide.
(20) Tetranitromethane.
(21) Toxaphene.
(22) All soluble cyanide salts.

(23) Phorate (also for Disulfoton), or 0, 0-diethyl-S- (ethylthio) methyl - phosphorodithioate (Thimet R), and disulfoton, or 0, 0-diethyl-S- (2-ethylthio) ethyl phosphorodithioate (Di-System R).

(24) Parathion (and Methyl parathion), or 0, 0-diethyl-0-p-nitrophenylphosphorthioate, and methyl parathion, or 0, 0-dimethyl-0-p-nitrophenylphosphorothioate.

(25) Pentachlorophenol (PCP).

b. Specific waste types:

(1) Bulk liquids including solvents.

(2) Explosives.

(3) Highly soluble metal salts.

(4) Radioactive (in chemical waste landfills).

(5) Shock sensitive.

(6) Pyrophoric.

(7) Flash point less than 80° F.

The commissioner may, where necessary, promulgate rules and regulations further defining the specific waste types listed in this paragraph.

c. Hazardous waste from specific sources:

(1) Wastewater treatment sludge from the production of chlordane.

(2) Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.

(3) 2,6-dichlorophenol waste from the production of 2,4-D.

(4) Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin.

(5) Wastewater treatment sludge from the production of toxaphene.

(6) Untreated process wastewater from the production of toxaphene.

(7) Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.

2. The commissioner may promulgate regulations from time to time, as appropriate, adding particular high priority hazardous wastes to the lists contained in this section, upon a finding that under existing technology presently available to the hazardous waste disposal industry, it is practicable, at present or within the time periods contained in section 27-1505 of this title, to permanently dispose of such wastes by means other than land burial, when environmental, social and economic factors are considered together.

§ 27-1505. Cessation of certain hazardous waste land burial.

Notwithstanding the provisions of any other law, rule or regulation except as provided in this title, on or after January first, nineteen hundred eighty-three, it shall be unlawful for any person to bury, or cause to be buried, in or on the ground, in sanitary landfills, secure land burial facilities or in any manner whatsoever, any form of high priority hazardous waste. However, nothing in this section shall be deemed to restrict the proper use and application of pesticides consistent with the provisions and requirements of article thirty-three of this chapter.

§ 27-1507. Certification of exemption.

1. Notwithstanding the provisions of section 27-1505 of this title, the commissioner may, upon application of any person, certify a specifically enumerated high priority hazardous waste as eligible for land burial after the applicable cessation date for land burial of such waste.

2. A certificate of exemption may be issued for a particular high priority hazardous waste only in the event the commissioner finds that

under existing technology presently available to the hazardous waste disposal industry, it is not practicable, at present or in the reasonably foreseeable future, to dispose of such waste by any means other than land burial, when environmental, social and economic factors are considered together.

3. Certificates of exemption shall be valid for a fixed term not to exceed one year. Any request for a renewal, reissuance or recertification of exemption shall be treated as an application for a new certificate of exemption.

4. Upon his own initiative, the commissioner shall review from time to time particular certificates of exemption granted pursuant to this section. Such a certificate shall be revoked if the commissioner finds that the circumstances upon which it was based no longer exist.

5. The rules and regulations adopted by the department to implement titles seven and nine of this article and the provisions of article seventy of this chapter and the rules and [illegible] shall govern applications for certificates and revocation proceedings under this section.

§ 3. Section 71-2705 of such law, as added by chapter five hundred fifty of the laws of nineteen hundred eighty, subdivision one [illegible] by chapter three hundred fifty-one of the laws of nineteen hundred eighty-one, is amended to read as follows:

§ 71-2705. Violations of titles 9, 11 [and], 13 and 15 of article 27 of this chapter.

1. Civil and administrative sanctions. Any person who violates any of the provisions of, or who fails to perform any duty imposed by titles 9, 11 [and], 13 and 15 of article 27 or any rule or regulation promulgated pursuant thereto, or any term or condition of any certificate or permit issued pursuant thereto, or any final determination or order of the commissioner made pursuant to this title shall be liable in the case of a first violation, for a civil penalty not to exceed twenty-five thousand dollars and an additional penalty of not more than twenty-five thousand dollars for each day during which such violation continues, to be assessed by the commissioner after an opportunity to be heard pursuant to the provisions of section 71-1709 of this chapter, or by the court in any action or proceeding pursuant to section 71-2707 of this chapter, and, in addition thereto, such person may by similar process be enjoined from continuing such violation and any permit or certificate issued to such person may be revoked or suspended or a pending renewal application denied. In the case of a second and any further violation, the liability shall be for a civil penalty not to exceed fifty thousand dollars for each such violation and an additional penalty not to exceed fifty thousand dollars for each day during which such violation continues.

2. Criminal sanctions. Any person who, having any of the culpable mental states defined in section 15.05 of the penal law, shall violate any of the provisions of or who fails to perform any duty imposed by titles 9, 11 [and], 13 and 15 of article 27 or any rules and regulations promulgated pursuant thereto, or any term or condition of any certificate or permit issued pursuant thereto, or any final determination or order of the commissioner made pursuant to this title shall be guilty of a misdemeanor and, upon conviction thereof, shall for a first conviction be punished by a fine not to exceed twenty-five thousand dollars per day of violation or by imprisonment for a term of not more than one year, or both such fine and imprisonment. If the conviction is for an offense

committed after a first conviction of such person under this subdivision, punishment shall be by a fine not to exceed fifty thousand dollars per day of violation, or by imprisonment for not more than two years or by both such fine and imprisonment.

§ 4. This act shall take effect on the sixtieth day after it shall have become a law.

DEC 9 1981

New York State Department of Environmental Conservation
600 Delaware Avenue, Buffalo, New York 14202

Robert F. Flacke
Commissioner

November 20, 1981

RECEIVED
DEC 10 1981
BUREAU OF
HAZARDOUS WASTE TECHNOLOGY
DIVISION OF SOLID WASTE

Mr. R. A. Stadelmaier, President
CECOS International, Inc.
P.O. Box 619
Niagara Falls, NY 14302

Dear Mr. Stadelmaier:

Enclosed please find a permit to operate SCMF #4 and 5 (permit no. 2561). The permit will become effective upon written notification by the Department.

Some conditions have been modified as requested in a letter from Mr. Gedeon to the Department dated September 14, 1981.

Our responses to the various items of the above letter are as follows:

Item A.1: Subsequent verbal communication with Mr. Gedeon has indicated that, though requested by letter, the modification of the expiration date is not critical; the original expiration date of July 1, 1986 has been retained.

Items B.1, B.2, B.3, B.4 and B.5: The [illegible] cost estimates for SCMF #4 and 5 were approved in an October 6, 1981 letter from this department to you.

Item B.6: It is Departmental policy that financial surety to cover the costs of pre-closure monitoring and maintenance, closure and post-closure monitoring and maintenance be submitted for all hazardous waste disposal facilities prior to any issuance of authorization to operate.

[illegible] financial [illegible] dated February 19, 1981).

Item B.7: [illegible] letter from the Department to Mr. Stadelmaier.

[illegible]

[illegible]

[illegible] request.

Item C.10: The requested change has been made.

Item C.11: The condition remains as written.

Item C.12.b: The requested change has been made.

Item C.12.c: The requested change has been made.

Item C.12.d: The requested change has been made.

Item 15: The request is of a nature to have required presentation at public hearing. Inasmuch as this was not done, the request cannot be granted at this time.

Item C.21: The requested change has been made.

Item C.24: The change has been made, but with some qualification; the requirement for cleaning of vehicles can be waived on a case-by-case basis.

Item C.28: This condition has been reworded to be consistent with engineering report for SCMF #4.

Item C.30: This condition represents Department Policy with respect to the future landfilling of such substances. CECOS has been given adequate lead time to develop alternate means of handling of such substances.

The following is a Department-initiated modification (i.e. changes to the Draft):

Item C.1: Wording changed to reflect new procedures for packaging of phosphorus pentasulfide and acid chlorides.

Very truly yours,

[illegible], P.E.
[illegible] Engineer

[illegible]:k

cc: Mr. Darby [illegible]
Mr. [illegible]
Mr. [illegible]
[illegible]

[illegible] NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO.	
EXPIRATION DATE	

PERMIT

Under the Environmental Conservation Law, Article 27, Title 7, Part 360

☐ CONSTRUCTION ☐ INITIAL ISSUE ☐ REISSUANCE
☐ OPERATION ☐ RENEWAL ☐ MODIFICATION

PERMIT ISSUED TO	ADDRESS OF PERMITTEE	TELEPHONE NO.
LOCATION OF PROJECT Town	County	Environmental Conservation Regional Office
DESCRIPTION OF PROJECT		ON-SITE SUPERVISOR

GENERAL CONDITIONS

1. The permittee shall file in the office of the Environmental Conservation Region specified above, a notice of intention to commence work at least 48 hours in advance of the time of commencement and shall also notify said office promptly in writing of the completion of the work.
2. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation who may order the work suspended if the public interest so requires.
3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.
4. All work carried out under this permit shall conform to the approved plans and specifications. Any amendments must be approved by the Department of Environmental Conservation prior to their implementation.
5. The permittee is responsible for obtaining any other permits, approvals, easements and rights-of-way which may be required for this project.
6. By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with Part 360 and the special conditions. Any variances granted by the Department of Environmental Conservation to Part 360 must be in writing and attached hereto.

SPECIAL CONDITIONS

ISSUE DATE	ISSUING OFFICER	SIGNATURE

CENTRAL OFFICE

B. Secure Chemical Management Facilities #4 and #5.
The special conditions contained herein shall apply to the facilities listed in A preceding and further identified in C and D following.

1. The Permittee shall provide within 60 days of the effective date of this permit, a cost estimate for those parts of the Monitoring, Maintenance, and Contingency Plan (MMCP, Condition 5, below) which cover pre-closure monitoring and maintenance for each facility. Within 90 days after the Department's approval of the cost estimate, the Permittee shall secure or establish an appropriate financial instrument to assure the proper performance of pre-closure monitoring and maintenance as provided in this permit. The selection of the particular financial instrument shall be subject to the approval of the Department. The Permittee shall maintain this financial instrument for the life of the facilities permitted hereunder. The Permittee shall provide written evidence of such financial instrument to the Department and shall provide annually during operation, commencing on the date one year after the issuance of this permit, written evidence that it is maintaining the financial instrument described in this condition.

2. The Permittee shall, within 60 days of the effective date of this Permit, provide the Department with a detailed estimate of the cost of its closure plans for each facility. The estimate shall equal the cost of closure at the point in each facility's operating life when the extent and manner of its operation would make closure the most expensive, as indicated by its closure plan or pursuant to applicable federal or state requirements.

The Permittee shall prepare a new closure cost estimate whenever a change in the closure plan or applicable federal or state requirements affect the cost of closure.

On each anniversary of the date of issuance of this permit, the Permittee shall adjust the latest closure cost estimate using an inflation factor derived from the annual Implicit Price Deflator for Gross National Product as published by the U.S. Department of Commerce in its Survey of Current Business. The inflation factor shall be calculated by dividing the latest published annual Deflator by the Deflator for the previous year. The result will be the inflation factor. The adjusted closure cost estimate shall equal the latest closure cost estimate times the inflation factor.

Within 90 days after the Department's approval of its closure plans and cost estimates, the Permittee shall [illegible] an appropriate financial instrument [illegible] closure plans [illegible] by the [illegible] applicable federal or state requirements.

The selection of [illegible] shall be subject to the [illegible] shall be established and [illegible] by the regulations [illegible] will provide written evidence [illegible]

[illegible]

annually during site operation, commencing on the date one year after the issuance of this permit, written evidence that it is maintaining the financial instrument described in this condition.

Upon the Department's approval of successful completion of closure of each facility, the Department shall approve reimbursement to the Permittee of the unexpended sum attributable to that facility (together with accrued interest thereon).

3. The Permittee shall submit, within 60 days of the effective date of this permit, a 30 year cost estimate for those parts of the MMCP covering post-closure monitoring and maintenance activities and an estimate of the annual payments during the period of pre-closure operation of each facility necessary to secure or establish an appropriate financial instrument which at the time of closure or the end of the permit term, whichever is sooner, will be sufficient to cover the required implementation for 30 years after closure. The same financial instrument establishment and administration procedure described above for site closure is to be followed in this instance, except that the reimbursement to the Permittee shall be semi-annual.

4. As to each of the financial mechanisms described in conditions 1, 2, and 3 above, in the event that applicable federal or state law or regulations mandate additional or different requirements or longer time periods of financial coverage for monitoring and maintenance by the Permittee, payments by the Permittee and the financial arrangements described above are to be adjusted accordingly. The Permittee shall annually re-evaluate closure and post-closure costs and advise the Department of any changes required thereby in the financial instrument.

5. A Monitoring, Maintenance and Contingency Plan (MMCP) shall be submitted to the Department for approval within 60 days of the effective date of this permit. The MMCP shall include both pre-closure and post-closure monitoring and maintenance programs, and a contingency plan. The monitoring programs shall cover surface water quality, groundwater quality and hydrology, internal leachate levels, leachate sampling and analysis, and air quality and shall be of sufficient detail to demonstrate compliance with water and air quality criteria, design standards, and permit conditions. The MMCP shall include sampling schedules, sampling methods and other pertinent information. Maintenance shall include inspection and repair of all side slope and cover erosion and settling, cover vegetation, internal leachate withdrawal and treatment, surface drainage swales and appurtenances. The contingencies shall include remedial action for unexpected events below, on or above the site that the monitoring program may reveal and should also include remedial action for disasters such as fires.

6. Operation of [illegible] shall not be initiated prior to the fulfillment of [illegible] 1, 2, 3, [illegible] and 5 above for each facility, respectively.

7. Groundwater [illegible] monitoring stations shall be installed [illegible] of each facility. Sampling of [illegible] within one (1) month of installation [illegible].

8. The Permittee shall [illegible] legislative requirements in [illegible] the authority of the federal [illegible]

[illegible]

Hazardous Waste Management Act of 1978. Included, but not limited hereto, would be compliance with any hazardous waste manifesting requirements.

9. Within 6 months of the issuance date of this permit, the Permittee shall develop a plan and schedule to train personnel, including drivers, concerning safety procedures. Addressed should be those procedures to be followed in the event of a spill as well as those to be followed while unloading and loading at the process areas.

10. The Permittee shall provide site access to representatives of the Department or Niagara County Health Department for the purposes of assisting on-site Department inspectors in investigating the occurrence of odors suspected of being attributable to CECOS' Pine Avenue Operations or determining compliance with regulations and permit conditions.

11. On a monthly basis, the Permittee shall obtain leachate samples from each subcell (at subcells with two (2) standpipes, a leachate sample shall be obtained from each standpipe on an alternating monthly basis), analyze the leachate for PH and TOC, and measure the leachate level.

Metals analysis shall be provided on a quarterly basis and a Gas Chromatographic Scan annually for the leachate in each subcell. The Permittee shall also measure and report the volume of leachate transfered monthly from each subcell. Air monitoring of standpipes and vents shall be performed annually during periods of lower than average annual barometric pressures. The barometric pressure must also be falling when samples are obtained.

12. The results of all required analyses shall be submitted to the Department within 30 days of the date of sampling or as otherwise specified in the Department approved MMCP.

13. Whenever this Permit requires a report or document to be submitted to the Department, copies shall be submitted to the Region 9 office and the Bureau of Hazardous Waste in the central Albany office.

C. Secure Chemical Management Facility #4, Facility ID No. 32826
The following special conditions shall apply to Secure Chemical Management Facility #4 (Facility Identification No. 32826). This Permit to Operate Secure Chemical Management Facility #4 (SCMF #4) shall be effective only upon written notification by the Department. Said notification shall be issued only after compliance with the Permit to Construct SCMF #4.

1. SCMF #4 shall be operated in strict conformance with the Facilities Operation Plan for Secure Chemical Management Facilities (hereafter referred to as the Operation Plan), submitted in [illegible] of 1980, except as modified by certain packaging requirement indicated in [illegible] to the Department dated September 1, 1981, or other special conditions of this permit.

2. All wastes are to be [illegible] solidified prior to [illegible] to the maximum extent feasible in a manner [illegible] by the [illegible] of disposal. A revised Operation Plan shall be submitted to the Department to fully describe this practice. The report must fully justify the degree or type of solidification or

fixation applicable to each waste or class of wastes.

3. Wastes are to be segregated by their chemical properties and covered by appropriate materials in accordance with Section F of the Operation Plan, except as modified by special conditions in this permit. Wastes are to be segregated into five (5) major subcells and further segregated into designated areas within the subcells. The wastes are to be segregated into five (5) subcells as follows:

   a. Subcell I - The General Subcell: This subcell is to receive waste materials having contaminants described in Group VI (except sulfides) through IX of the Controlled Contaminants. These wastes may include insignificant quantities or concentrations of Group I through IV contaminants.

   b. Subcell II - The Pseudometal Subcell: This subcell is to receive waste materials containing Group II, Pseudometal; Group III, Chalcogenic; and Group IV, Beryllium compounds. These compounds include compounds containing antimony, arsenic, beryllium, bismuth, phosphorus, selenium, and tellurium. Pseudometal compounds to be landfilled, are to have a maximum solubility of 100 mg/l of the element when buffered to the pH 5-8 range. An appropriate buffer shall be incorporated in the daily cover to maintain subcell pH between 5 and 8. Alkaline sensitive wastes are to also be included in this subcell.

   c. Subcell III - The Heavy Metal Subcell: This subcell is to receive waste materials containing Group V of the Controlled Contaminants heavy metals and their salts. Heavy metals include: cadmium, chromium, copper, cobalt, barium, iron, lead, manganese, mercury, molybdenum, nickel, noble metals, strontium, thallium, tin, titanium, tungsten, zinc, zirconium, and vanadium. Very soluble salts such as cyanides and other soluble strong complexes shall be converted to insoluble form prior to landfilling; however, the conversion may be accomplished by in-situ processes during disposal operations upon specific approval from the Department for individual waste streams. This subcell shall also receive waste materials having contaminants described in Group V and VI (sulfides only) of the Controlled Contaminants. Lime or other alkaline material, sufficient to buffer the subcell pH above 8.5 shall be included in the daily cover.

   d. Subcell IV - The Flammable Subcell: Wastes to be disposed in this subcell are those exhibiting a flash point [illegible] 140°F. Wastes which are strong oxidizing agents, or which are subject to spontaneous heating or which react with air or moisture to evolve heat are excluded from this subcell.

   e. Subcell V [illegible] materials containing [illegible] 2 percent by weight [illegible] Dictionary [illegible] rating of [illegible] would [illegible]

4. [illegible]

organics and highly flammable wastes are to be excluded from this subcell.

4. Waste within each subcell shall be further segregated within each subcell by areas in accordance with the area segregation technique described in Section 3 of the Operation Plan and the specific cover material for each segregated waste group shall also be as described in Section 3 of the Operation Plan, except as modified by special conditions in this Permit.

   a. Grid location numbers 30, 35, 50, 51, 60-63, 72 and 73 are designed for area segregation of general wastes including Group VIII - hazardous or potentially hazardous organic wastes.

   b. Grid location numbers 47-49, 50-55, 60-63, 72 and 73 shall have the following cover requirements:

      i. Type 2 - soils, ashes and lime.
      ii. Type A, CECOS generated sludges, are allowed, but are not required in these areas.

5. When a waste falls into more than one segregation category, the containment of greatest concern because of its hazardous property and/or volume shall determine the subcell or area in which the waste shall be disposed. The Permittee shall submit approval proposals to the Department for handling wastes that fall into more than one segregation category prior to the acceptance of any such waste at the site.

6. The "Waste Acceptance Criteria Limitations and Guidelines" in Section 2.3 of the Operation Plan is to be strictly followed. The following limitations and restrictions shall apply.

   a. A waste material containing any specific organic compound in concentrations in excess of 5 percent weight or exceeding an amount of 100 lbs. for that compound for the entire landfill, that is designated as "highly toxic" by The Condensed Chemical Dictionary, Hawley, Gessner, G., Ninth Edition, Van Nostrand Reinhold Company, or labeled with a "severe toxicity" rating or highly toxic in Dangerous Properties of Industrial Materials, Sax, Irving, Fifth Edition, will require supplemental approval from the Department prior to that waste material's disposal in SCM 34.

   b. A waste material containing any organic [illegible] by OSHA as a carcinogen, in concentrations in [illegible], or exceeding a total of 100 lbs. for that organic [illegible] supplemental approval from the [illegible].

   c. [illegible]

   d. [illegible]

      i. [illegible]
      ii. [illegible]

[illegible]

7. No waste or antagonistic waste mixture shall be placed or produced in SCMF #4 which is known to possess the chemical or physical - chemical ability to penetrate the compacted clay and synthetic membrane liners.

8. No waste or waste combinations shall be placed in SCMF #4 which are capable of generating gaseous contaminants considered to be unnatural to the environment or which contain controlled contaminants easily capable of becoming airborne, unless it is suitably containerized.

9. No waste or waste mixtures which possess a pour point at 75°F shall be placed into SCMF #4 unless approved by the Department. Quality control methods shall be submitted for Departmental approval.

10. No waste or waste mixtures which contain in excess of 5 percent by volume of free liquid at its infinite settling point shall be placed in SCMF #4. Quality control methods shall be submitted for Departmental approval.

11. No containerized waste that contains in excess of 15 percent free fluid by volume at its infinite settling point shall be placed in SCMF #4.

12. Unless special cover components are provided to safely react with these types of contaminants to cause adsorption, precipitation, or complexation, reducing solubility in situ, the following solubility limitations shall apply to all wastes or waste mixtures which may be placed or created in SCMF #4.

    a. Common Contaminant Components that have a solubility in water at 25°C in excess of 10 percent by weight of the waste shall not be landfilled without prior Department approval. Water soluble constituents shall be limited to 10 percent of the total volume of the landfill unless a 6th subcell is provided for water soluble materials. Placement of drums containing soluble materials shall be in a manner that each drum containing an excess of 10 percent water soluble material will be surrounded in all directions by two (2) drums of water insoluble material unless a special cell is provided. Special approval shall be obtained for any bulk material with soluble components exceeding 10 percent by volume if the total of such bulk material is to exceed 20 cubic yards.

    b. Group I and Group II Controlled Contaminants, and selenium, tellurium, and beryllium and their compounds that have a solubility in water at 25°C in excess of 0.025 percent by weight.

    c. Hazardous oxidizers, inorganic acid [illegible], and acid or acid generating contaminants in excess of 1.0 percent by weight, or

    d. Group III, Controlled Contaminants that have a solubility in water at 25°C in excess of 0.05 percent by weight of the waste.

13. Copies of daily grid work sheets are to be available during inspections and submitted weekly to the Department and the Niagara County Health Department. A concise waste description, adequately referenced in key form, shall be included in the report. A waste material recording and coding system which [illegible] nomenclature, [illegible] and waste descriptions compatible with the system used for [illegible] shall be used.

14. Within one week of the completion of each increase in internal berm height and side slope liner cover clay to accomodate an additional layer of drums, a certification by a New York State Licensed Professional Engineer (P.E.) with experience in soils engineering shall be submitted to the Department. Said certification shall include verification that the internal berms and cover clay were installed in accordance with approved plans and specifications.

15. Maximum leachate level at the leachate pumps shall not exceed two (2) feet above the lowest elevation of the floor of the area being drained. Inner leachate withdrawal operations are to begin when an action level of twelve (12) inches innage is reached or as specified in the Department approved MMCP.

16. The internal leachate shall be incinerated or treated in a system approved in writing by the Department for the treatment of leachate. No waste materials or incompatible waste mixtures shall be placed or produced in SCMF #4 that may result in leachate which cannot be treated effectively.

17. Placement of intermediate cover material shall be accomplished in such a manner as to minimize void space between drums.

18. If a practical alternative method of processing, reclaiming or destruction becomes available for a specific waste, the Permittee shall pursue with the Department the feasibility of using such an alternative method. If a method of destruction becomes available for a specific waste of long-term concern, approval may be withdrawn to landfill that waste at that time.

19. Standpipes are to be covered at all times during site operation (except when pumping leachate) and after closure. Vapor emissions from standpipes are to be controlled at all times.

20. Exterior and interior side slopes forming SCMF #4 shall be inspected weekly for slumpage, erosion and other structural problems. All observed problems shall be reported to the Department within 24 hours.

21. Leachate levels in the standpipes shall be monitored and pumped automatically utilizing permanently installed, sensors, pumping equipment and receiving vessels as specified in the MMCP. One additional operable pump shall be provided and stored in a place of ready access at all times so as to be readily available for the purpose of replacing those in the standpipes should failure occur; inoperable pumps shall be replaced within 48 hours of failure. Leachate pumps shall be fitted with power failure and high leachate level indicator alarms centrally located at a place of continual, if not continuous, attendance. The leachate in each subwell shall be analyzed on a monthly basis, as described in condition B.11, and the results of the analysis shall be submitted to the Department.

22. Upon closure of SCMF #4, the Permittee shall submit a Licensed Professional Engineer's written certification, including as-built drawings, that the closure construction is in accordance with the approved report, plans, drawings and specifications.

23. Wastes contaminated with PCB's shall be stored and disposed of in accordance with Federal laws, regulations, permits and approvals.

24. Vehicles entering SCMF #4 and either coming in contact with waste therein, or bulk solid waste transport vehicles having been contaminated with waste products delivered shall be cleaned of all material prior to leaving the site, unless the vehicle is to be reused for transport of similar bulk waste material, and upon specific individual approval by the Department. Vehicles or equipment which have entered SCMF #4 shall be inspected for gross contamination prior to leaving the landfill. Visible gross contamination shall be physically removed in order to prevent contamination of on-site roads leading to the truck wash facility.

25. Operation of SCMF #4 shall not cause ambient air quality standards as specified in 6NYCRR Part 257 to be exceeded.

26. The resulting void space between the standpipes and the surrounding drums shall be filled with stone thereby improving vertical hydraulic communication within the landfill.

27. A waste lift should consist of one drum height, for drum containers and for uncontained bulk wastes, unless approved otherwise in the Facility's Operation Plan or as approved by the Department for uniquely containerized wastes.

28. No sludge material is to be deposited into the initial layer of drums immediately adjacent to the floor. A porous material, capable of meeting the specifications described in the Engineering Report for SCMF #4 so as to provide the designed graded filter, shall be used to fill the voids between the drums in this first lift to supplement the hydraulic conductivity capability of the leachate collection system.

29. Within six (6) months of the cessation of placement of waste in SCMF #4, the Permittee shall submit to the Department a complete report of all waste disposed of in SCMF #4, including a three (3) dimensional grid and a concise description of each waste.

30. Consistent with Departmental policy which will be reflected in all similar permits, hazardous waste, as defined by 40 CFR Part 261, which contains any of the organic substances listed in 40 CFR 261.33 (e) shall not be landfilled by the Permittee after January 1, 1985.

E. Secure Chemical Management Facility #5, Facility ID No. 32827
The following special conditions shall apply to Secure Chemical Management Facility #5 (Facility Identification No. 32827). This Permit to Operate Secure Chemical Management Facility #5 (SCMF #5) shall be effective only upon written notification by the Department. Said notification shall be issued only after compliance with the Permit to Construct SCMF #5. If there are unforeseen operational problems in SCMF #4 or changes in technology or scientific information, the Department may modify or add to these conditions in accordance with the procedures of 6NYCRR Part 621 (Uniform Procedures).

1. SCMF #5 shall be operated in strict conformance with the Facilities Operation Plan for Secure Chemical Management Facilities (herein after referred to as the Operation Plan), submitted in August of 1980, except as modified by special conditions contained in this Permit.

2. All wastes are to be fixed or solidified prior to disposal to the maximum extent feasible in a manner dictated by the character of the wastes and mode of disposal.

A revised Operation Plan shall be submitted to the Department to fully describe this practice. The report must fully justify the degree or type of solidification or fixation applicable to each waste or class of wastes.

3. Wastes are to be segregated by their chemical properties and covered by appropriate material in accordance with Section 3 of the Operation Plan and Supplement #1 to the Facilities Operation Plan, Subcell and Area Segregation, SCMF #5, submitted June of 1980. The wastes are to be segregated into five (5) subcells as described in special condition #3 in the Permit to Operate SCMF #4.

4. Operation of SCMF #5 shall also be in accordance with special conditions #4 through #30, inclusive, contained in the Permit to Operate SCMF #4.

5. The Permittee shall submit to the Department, five (5) months prior to the initiation of operations at SCMF #5, either a Professional Engineer's certification that the proposed operating procedures meet all current State and Federal regulations or a supplemental report modifying the proposed operating procedures in order to provide regulatory compliance.

NOTICE OF PERMIT

for:

☐ CONSTRUCTION ☐ INITIAL ISSUE ☐ REISSUANCE

☒ OPERATION ☐ RENEWAL ☐ MODIFICATION

has been issued to: CECOS International, Inc. and Niagara Recycling, Inc.

address: Niagara Recycling, Inc. - 1300 Military Road, Kenmore, New York 14217
CECOS International, Inc. - Walmore Road & Niagara Falls Blvd., [illegible], New York [illegible]

for a project described as: Subject to written authorization
Secure Chemical Management Facility [illegible]

under the Environmental Conservation Law,
Article 27, Title 5, Part 360 (Solid Waste Management Facilities)

NOTE:
- This Notice of Permit must be posted on the project site in such a manner that it is protected from weather and is in a location readily visible to the public.
- A copy of the Permit with the general and special conditions noted thereon will be shown to anyone upon request.

John L. Beecher, P.E.
Issuing Officer

600 Delaware Avenue, Buffalo, New York [illegible]
Address

2561 11/20/81 7/1/8[illegible]
Permit No. Issue Date Expiration Date

New York State
Department of Environmental Conservation

47-17-2 (8/77)

[illegible] NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

	2728
EXPIRATION DATE	May 1, 1984

PERMIT

Under the Environmental Conservation Law, Article 27, Title 7, Part 360

☐ CONSTRUCTION ☐ INITIAL ISSUE ☐ REISSUANCE
☒ OPERATION ☐ RENEWAL ☐ MODIFICATION

PERMIT ISSUED TO SCA Chemical Services, Inc.	ADDRESS OF PERMITTEE 1550 Balmer Road, Model City, NY 14107	TELEPHONE NO. (716) 754-8231
LOCATION OF PROJECT Town: Porter/Lewiston	County: Niagara	Environmental Conservation Regional Office Region 9-600 Delaware Avenue, Buffalo, NY 1[illegible]
DESCRIPTION OF PROJECT SLF #10		ON-SITE SUPERVISOR James Greeley

GENERAL CONDITIONS

1. The permittee shall file in the office of the Environmental Conservation Region specified above, a notice on intention to commence work at least 48 hours in advance of the time of commencement and shall also notify said office promptly in writing of the completion of the work.
2. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation who may order the work suspended if the public interest so requires.
3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.
4. All work carried out under this permit shall [illegible] plans and specifications. Any amendments must be [illegible] Department of Environmental Conservation prior to their implementation.
5. The permittee is responsible for obtaining any other permits, approvals, easements and rights-of-way which may [illegible] this project.
6. By acceptance of this permit, the permittee agrees that [illegible] contingent upon strict compliance with Part 360 and the [illegible] conditions. Any variances granted by the Department of Environmental Conservation to Part 360 must be in writing [illegible]

SPECIAL CONDITIONS

The following special conditions shall apply to Secure Landfill Facility #10 (Facility I.D. No. 32B12). This Permit to Operate Secure Landfill Facility #10 (SLF #10) shall be effective only upon written notification by the Department.

SCA Chemical Services, Inc. - Secure Landfill Facility #10, Facility I.D. No. 32B12

1. The Permittee shall obtain Departmental approval in accordance with Special Conditions 2, 3, 4, 5, and 8 of the Permit to Operate the Model City Facility (Permit #2343, Facility I.D. No. 32B10) prior to operation of SLF #10.

2. SLF #10 shall be operated in strict conformance with the Operation Report, dated February 23, 1979, and the SLF #10 Engineering Report, as revised January 31, 1982, except as modified by special conditions contained in this permit.

3. The expiration date of this permit, as shown above, is subject to the following limitation: in the event that prior to the expiration date of this permit there is a revocation, suspension, or denial of renewal of permits #2343 or NY-0072061, this permit will automatically terminate concurrently with such event.

4. The Department will review this permit and appropriately modify it concurrently with the review and renewal of the permits referenced in special condition #3 above.

5. The permittee shall comply with any technical or administrative requirements in regulations to be promulgated by New York State under the authority of the Industrial Hazardous Wastes Management Act of 1978 (The Environmental Conservation Law Article 27, Title 9). Included, but not limited hereto, would be compliance with any hazardous waste manifesting requirements.

Page 1 of 7

ISSUE DATE August 9, 1982	PERMIT ISSUED BY John L. Boucher, P.E.

6. The permittee shall provide site access to representatives of the Department or the Niagara County Health Department for the purposes of assisting on-site Department inspectors in investigating the occurrence of odors suspected of being attributable to permittees facility.

7. Any time reports, plans, schedules or other documents are requested by permit conditions or by the U.S. Environmental Protection Agency, such reports are to be submitted to the New York State Department of Environmental Conservation, Division of Solid Waste, Albany and Region 9 office, as well as to the Niagara County Health Department.

8. All wastes are to be fixed and solidified prior to disposal to the maximum extent possible in a manner warranted by the chemistry of the wastes and means of [illegible]. Fixation and solidification shall be in accordance with the report entitled "Transfunctional Stabilization and Fixation for Ultimate Disposal at SCA Chemical Services Facilities" and approved by the Department on July 30, 1981. [illegible] methods for assuring that the free liquid and free fluid requirement [illegible] met should be submitted to this Department for approval.

9. Wastes are to be segregated by their chemical properties and covered by appropriate [illegible] in accordance with Section [illegible] of the Operations Report [illegible] February 23, 1979 except as modified by special conditions in this permit. Wastes are to be segregated into five major subcells and further segregated into isolated areas within the subcells. The wastes are to be segregated into five (5) subcells as follows:

   a. Subcell I - The Heavy Metal Subcell. This subcell is to receive waste materials containing Group I compounds (Table 3.2(III)(C)(1)(a) of the Operations Report) of the Controlled Contaminant [illegible]. Heavy metals include: cadmium, chromium, copper, cobalt, barium, iron, lead, manganese, mercury, molybdenum, nickel, noble metals, strontium, thallium, tin, titanium, tungsten, zinc, zirconium, and vanadium. Very soluble salts such as cyanides and other soluble strong complexes shall be converted to insoluble forms prior to landfilling. Lime or other alkaline materials sufficient to buffer subcell pH above 9.5 shall be included in the daily cover.

   b. Subcell II - The Pseudometal Subcell. This subcell is to receive waste materials containing Group II Compounds (see Table 3.2(III)(C)(1)(b) of the Operations Report), Pseudometal, Chalcogenic and Beryllium compounds. [illegible] compounds include compounds containing antimony, arsenic, beryllium, bismuth, phosphorous, selenium, and tellurium. Pseudometal compounds to be landfilled are to have a maximum solubility of 100 mg/l of the element when buffered to the pH 5-8 range. An appropriate buffer shall be incorporated in the daily cover to maintain subcell pH between 6 and 8. Alkaline sensitive wastes are to also be included in this subcell.

   c. Subcell III - The Organic Subcell. This subcell is to receive waste materials having contaminants described as Group III contaminants and listed in Table 3.2(III)(C)(2)(a) of the Operations Report.

iv. Subcell IV - Halogenated Wastes. This subcell is to receive waste materials containing significant concentrations of toxic organic contaminants. Waste materials containing any specific organic compound in concentrations in excess of 2 percent by weight that are designated as "highly toxic" by The Condensed Chemical Dictionary, Hawley, Gessner G., Ninth Edition or labeled with a "severe toxicity" rating of high by any route in Dangerous Properties of Industrial Materials, Sax, Irving, Fifth Edition, are included in this subcell. Also included are known or suspected carcinogens, halogenated organics including wastes contaminated with PCB's, and pesticides and their residues, and wastes contaminated with toxic organics determined or suspected of being environmentally persistent or bioaccumulative. Waste containing significant quantities or concentrations of solvents or other organics which would mobilize toxic organics and highly flammable wastes are to be excluded from this subcell.

v. Subcell V - The Flammable Subcell. Wastes to be designated to this subcell are those exhibiting a flash point between 60 and 140°F. Wastes which are strong oxidizing agents, or which are subject to spontaneous heating or which react with air or moisture to [illegible] heat are excluded from this subcell.

10. [illegible] each [illegible] wastes segregated within each subcell [illegible] in accordance with the [illegible] segregation technique described in Section 5.4.4 of the Operations Report. Grid segregation shall be modified to incorporate an acid sensitive and alkaline sensitive area. Within 30 days of the issuance of this permit, the permittee shall submit to the Department a grid sheet for SLF-10 showing segregation areas.

11. When a waste falls into more than one segregation category, the constituent of greatest concern because of its hazardous property and/or volume shall determine the subcell or area in which the waste shall be disposed.

12. The following special approval requirements (see Table 3.2(III)(6) of the Operations Report), limitations and restrictions shall apply:

a. A waste material containing any specific organic compound in concentrations in excess of 2 percent by weight or exceeding an amount of 100 lbs. for that compound for the entire landfill, that is designated as "highly toxic" by The Condensed Chemical Dictionary, Hawley, Gessner, G., Ninth Edition, Van Nostrand Reinhold Company, or labeled with a "severe toxicity" rating of high by any route in Dangerous Properties of Industrial Materials, Sax, N. Irving, Fifth Edition, will require supplemental approval from the Department prior to that waste material's disposal in SLF-10.

b. A waste material containing any organic chemical designated by OSHA as a carcinogen, in concentrations in excess of 0.1 percent by weight, or exceeding a total of 100 lbs. for that organic compound [illegible] within SLF-10 will require supplemental approval from the Department prior to that waste material's disposal in SLF-10.

c. Waste materials containing radioactive isotopes, explosives, shock sensitive, or pyrophoric substances are not permitted for disposal in SLF-10.

d. No wastes of waste mixture shall be placed or created in SLF-10 that possess an NFPA Reactivity Hazard Rating of 3 or greater, furthermore:

1. No wastes with a flash point of less than 80°F are permitted.
2. No wastes from which natural biological activity may create within the landfill chemical products having an NFPA Flammable Hazard Rating of 3 or greater are permitted in SLF-10, with the excpetion of methane.

13. No waste or antagonistic waste mixture shall be placed or produced in SLF-10 which are known to possess the chemical or physical-chemical ability to penetrate the compacted clay and synthetic membrane liners.

14. No waste or waste combinations shall be placed in SLF-10 which are capable of generating gaseous contaminants considered to be unnatural to the environment or which contain controlled contaminants easily capable of becoming airborne, unless it is suitable containerized.

15. No waste or waste mixtures which possess a pour point at 75°F shall be placed into SLF-10 unless approved by the Department. Quality control methods shall be submitted for Departmental approval.

16. Unless special cover components are provided to safely react with these types of contaminants to cause adsorption, precipitation, or complexation, reducing solubility in situ, the following solubility limitations shall apply to all waste or waste mixture which may be placed or created in SLF-10.

a. Common Contaminant Components that have a solubility in water at 25°C in excess of 10 percent by weight of the waste shall not be landfilled without prior Department approval. Water soluble constituents shall be limited to 10 percent of the total volume of the landfill unless a 6th subcell is provided for water soluble materials. Placement of drums containing soluble materials shall be in a manner that each drum containing an excess of 10 percent water soluble material will be surrounded in all directions (in the same lift) by two (2) drums of water insoluble material unless a special cell is provided. Special approval shall be obtained for any bulk material with soluble components exceeding 10 percent by volume if the total of such bulk material is to exceed 20 cubic yards.

b. Group I and Group II Controlled Contaminants and their compounds that have a solubility in water at 25°C in excess of 0.025 percent by weight.

c. Hazardous oxidizers, inorganic acid sensitive anions, and acid or acid generating contaminants in excess of 1.0 percent by weight.

17. Copies of daily grid work sheets are to be available during inspection and submitted weekly to the Department and to the Niagara County Health Department. A concise waste description, adequately referenced in key form, shall be included in the report. A waste material recording and coding system with nomenclature, areas and waste descriptions shall be used.

18. Within one week of the completion of each increase in internal berm height to accomodate an additional layer of drums, a certification by a New York State Licensed Professional Engineer (P.E.) with experience in soils engineering shall be submitted to the Department. Said certification shall include verification that the berm was constructed in accordance with approved plans and specifications.

19. Maximum leachate level at the leachate pumps shall not exceed 2 feet above the lowest elevation of the floor of the area being drained. Inner leachate withdrawal operations are to begin when an action level of 18 inches innage is reached. Leachate withdrawal shall be given priority whenever leachate levels exceed two foot depth.

20. Departmental approval shall be obtained for any alternate treatment or disposal of the internal leachate not previously approved. No waste materials or antagonistic waste mixture shall be placed or produced in SLF #10 that result in leachate which cannot be treated effectively.

21. Placement of intermediate cover material shall be accomplished in such a manner as to minimize void space between drums.

22. If a practical alternative method of processing, reclaiming or destruction becomes available for a specific waste, the Permittee shall pursue with the Department the feasibility of using such an alternative method. If a method of destruction becomes available for a specific waste of long-term concern, approval may be withdrawn to landfill that waste at any time.

23. Standpipes are to be covered at all times during site operation (except when pumping leachate) and after closure. Vapor emissions from standpipes are to be controlled at all times.

24. Exterior and interior side slopes forming SLF #10 shall be inspected weekly for slumpage, erosion and other structural problems. All observed problems shall be reported to the Department within 24 hours.

25. Leachate levels in the standpipes shall be monitored and pumped automatically utilizing permanently installed sensors, pumping equipment and receiving vessels as specified in the MMCP. One additional operable pump shall be provided and stored in a place of ready access at all times so as to be readily available for the purpose of replacing those in the standpipes should failure occur; inoperable pumps shall be replaced within 48 hours of failure. Leachate pumps shall be fitted with power failure and high leachate level indicator alarms centrally located at a place of continual, if not continuous, attendance. The leachate in each subcell shall be analyzed on a monthly basis, as described in condition No. 41 of Permit to Operate the Model City Facility (Permit #2343, Facility I.D. 32812) and the results of the analysis shall be submitted to the Department, within 30 days of the end of the month during which the samples were collected.

26. Upon closure of SLF #10, the permittee shall submit a P.E.'s written certification, including as-built drawings, that the closure construction is in accordance with approved report, plans, drawings and specifications.

27. Wastes contaminated with PCBs shall be stored and disposed of in accordance with Federal laws, regulations, permits and approvals.

28. The resulting void space between the standpipes and the surrounding drums shall be filled with stone thereby improving vertical hydraulic continuity within the secure landburial facility.

29. The initial placement of segregated wastes into SLF #10 subcells shall be at the toe of slope of the berms forming the exterior of the secure landburial facility.

30. Special attention shall be given to maintaining the integrity of the exposed clay that ultimately forms the floor and sidewalls of SLF #10. Maintenance of the clay shall include, but not limited hereto, remedial work necessary to eliminate desiccation cracks and to minimize weathering of this clay surface in the interim period before it is covered with waste.

31. No sludge material is to be deposited onto the initial layer of drums immediately adjacent to the clay floor. A porous material shall be used to fill the voids between drums in this first lift to supplement the hydraulic conductivity to the leachate collection system.

32. Within six (6) months of the cessation of placement of waste in SLF #10, the Permittee shall submit to the Department a complete report of all waste disposed of in SLF #10, including a three dimensional grid and a concise description of each waste.

Permit #2728 Issue Date 5/[illegible]/82 Expiration Date 5/1/84 Issuing Officer John L. [illegible]

33. Operation of SLF #10 shall not cause ambient air quality standards, as specified in 6 NYCRR Part 257, to be exceeded.

34. A waste lift shall consist of one drum height, for containers and for uncontained bulk wastes, unless approved otherwise in the Facility's Operation Plan or as approved by the Department for uniquely containerized wastes.

35. Consistant with Departmental policy which will be reflected in all similar permits, hazardous waste, as defined by 40 CFR Part 261, which contains any of the organic substances listed in 40 CFR 261.33(e) shall not be landfilled by the Permittee after January 1, 1985.

NOTICE OF PERMIT

for:

☐ CONSTRUCTION
☒ OPERATION

☐ INITIAL ISSUE
☐ RENEWAL

☐ REISSUANCE
☐ MODIFICATION

has been issued to: SCA Chemical Services, Inc.

address: 1550 Balmer Road, Model City, New York 14107

for a project described as: SLF #10

under the Environmental Conservation Law,
Article 27, Title 5, Part 360 (Solid Waste Management Facilities)

NOTE:
- This Notice of Permit must be posted on the project site in such a manner that it is protected from weather and is in a location readily visible to the public.
- A copy of the Permit with the general and special conditions noted thereon will be shown to anyone upon request.

John L. Beecher, P.E.
Issuing Officer

600 Delaware Avenue, Buffalo, New York 14202
Address

2721	8/9/82	5/1/84
Permit No.	Issue Date	Expiration Date

New York State
Department of Environmental Conservation

47-12-2 (6/77)

New York State Department of Environmental Conservation
600 Delaware Avenue, Buffalo, New York 14202

Robert F. Flacke
Commissioner

RECEIVED
JUN 04 1982
BUREAU OF
HAZARDOUS WASTE TECHNOLOGY
DIVISION OF SOLID WASTE

May 1, 1981

Mr. George Spira, Vice President
SCA Chemical Services, Inc.
1550 Balmer Road
Model City, NY 14107

Dear Mr. Spira:

Enclosed please find your Permit to Operate (Permit No. 2343-Facility No. 32B10), Permit to Construct (Permit No. 2342-Facility No. 32B17), and also your SPDES Permit NY0072061 renewal per the Commissioner's decision. Stamped engineering report and plans will follow.

Should you have any questions in regard to the following, please contact me.

Very truly yours,

John L. Beecher, P.E.
Associate Chemical Engineer

JLB:sk

Enclosures

cc: NCHD
ACO

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PERMIT

Under the Environmental Conservation Law, Article 27, Title 7, Part 360

FACILITY NO. 2343

EXPIRATION DATE [illegible]34

☐ CONSTRUCTION ☐ INITIAL ISSUE ☐ REISSUANCE
☐ OPERATION ☐ RENEWAL ☐ MODIFICATION

ERMIT ISSUED TO SCA Chemical Services, Inc.	ADDRESS OF PERMITTEE 1550 Palmer Road, Model City, NY 14107	TELEPHONE NO. (716) 754-8231
OCATION OF PROJECT Town Porter/Lewiston	County Niagara	Environmental Conservation Regional Office Region 9-600 Delaware Avenue, Buffalo, NY 1420
ESCRIPTION OF PROJECT Model City Facility		ON-SITE SUPERVISOR Richard Young, Jr.

GENERAL CONDITIONS

1. The permittee shall file in the office of the Environmental Conservation Region specified above, a notice on intention to commence work at least 48 hours in advance of the time of commencement and shall also notify said office promptly in writing of the completion of the work.
2. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation who may order the work suspended if the public interest so requires.
3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.
4. All work carried out under this permit shall conform to the approved plans and specifications. Any amendments must be approved by the Department of Environmental Conservation prior to their implementation.
5. The permittee is responsible for obtaining any other permits, approvals, easements and rights-of-way which may be required for this project.
6. By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with Part 360 and the special conditions. Any variances granted by the Department of Environmental Conservation to Part 360 must be in writing and attached hereto.

SPECIAL CONDITIONS

This Permit to Operate shall apply to the [illegible] Permit to Operate Facility ID No. [illegible] (fuels blending, flash distillation, salts area, drum storage, treated wastewater storage, closed landfill #1-#6, wastewater treatment, and general site operations).

Page 1 of 12

SUE DATE [illegible]	ISSUING OFFICER [illegible]	SIGNATURE X

SCA Chemical Services, Inc. - Permit to Operate - Facility No. 32B10

1. The permittee shall have and maintain liability insurance in the amount of $2,000,000.00 per occurrence with an annual aggregate of $10,000,000.00, exclusive of legal defense costs, from an insurer licensed or eligible to insure facilities in New York State for claims resulting from sudden or accidental occurrences involving escape or release of hazardous wastes (as "hazardous wastes" is defined in 40 CFR Part 261) and arising out of injuries to persons or property from the operation of the Model City site. The deductible written into the insurance policy must not exceed 5% of the per incident limit of liability of the policy. The New York State Department of Environmental Conservation and the People of the State of New York shall be named as additional insureds in such policy. The policy shall provide that it shall not be cancelled without 30 days written notice, by certified mail, to the New York State Department of Environmental Conservation.

   The permittee shall provide within 60 days of the issuance of this permit, written evidence of this insurance policy, in a form acceptable to the Department. In addition, the permittee shall provide, annually during site operation, commencing on the date one year after the issuance of this permit, written evidence that it is maintaining the total coverage described in this condition.

2. Concerning preclosure monitoring and maintenance, the permittee must provide, within 60 days of the issuance of this permit, a cost estimate for those parts of the Monitoring, Maintenance, and Contingency Plan (condition 8 below) which cover monitoring and maintenance activities as to operating facilities or processes on the site. Within 30 days of the Department's approval of this cost estimate, the permittee shall secure or establish an appropriate financial mechanism to assure the proper performance of pre-closure monitoring and maintenance as provided in this permit. The selection of the particular financial mechanism shall be subject to the approval of the Department. The permittee shall maintain this financial mechanism for the life of the facilities permitted hereunder. The permittee shall provide written evidence of such financial mechanism to the Department and shall provide annually during site operation, commencing on the date one year after the issuance of this permit, written evidence that it is maintaining the financial mechanism described in this condition.

3. In regard to the closure of facilities or processes, the permittee shall, within 60 days of the issuance of this permit, provide to the Department for its approval detailed plans for the closing of each operating facility or process on the site, except as to those facilities or processes for which closure plans have already been approved by the Department. Also within 60 days of the issuance of this permit, the permittee shall provide to the Department for its approval a detailed estimate of the cost of closing each operating facility or process on-site in accordance with its plans and with any applicable federal or state requirements. The estimate shall equal the cost of closure at the point in each facility's operating life when the extent and manner of this operation would make closure the most expensive, as indicated by its closure plan or pursuant to applicable federal or state requirements.

   The permitte shall prepare a new closure cost estimate whenever a change in the closure plan or applicable federal or state requirements affect the cost of closure.

   On each anniversary of the date of issuance of this permit, the permittee shall adjust the latest closure plan estimate using an inflation factor derived from the annual Implicit Price Deflator for Gross National Product as published by the U.S. Department of Commerce in its Survey of Current Business. The inflation factor shall be calculated by dividing the latest published annual Deflator by the Deflator for the previous year. The result will be the inflation factor. The adjusted closure cost estimate shall equal the latest closure cost estimate times the inflation factor.

   Within 30 days after the Department's approval of all closure plans and cost estimates, the permittee shall secure or establish an appropriate financial mechanism to assure the proper implementation of its closure plan as approved by the Department and in accordance with applicable federal or state requirements.

   The selection of the particular financial mechanism shall be subject to the approval of the Department. The financial mechanism shall be established and maintained in such amounts and manner so that closure costs accrue by the expiration date of this permit.

   The permittee shall provide written evidence of such financial mechanism to the Department and shall provide annually during site operation, commencing on the date 1 year after the issuance of this permit, written evidence that it is maintaining the financial mechanism described in this condition.

4. Concerning post-closure monitoring and maintenance, the permittee shall submit, within 60 days of the effective date of this permit, a 30 year cost estimate for those parts of the Monitoring and Maintenance and Contingency Plan (MMCP) covering post-closure monitoring and maintenance activities as to facilities or processes already closed or to become closed, and an estimate of the payments, annual or otherwise, during the period of the pre-closure operation of such facilities or processes necessary to establish and maintain a financial mechanism which, at the time of closure or the end of the permit term, whichever is sooner, will be sufficient to cover the required implementation for 30 years after closure. Within 30 days after the Department's approval of this cost estimate, the permittee shall secure or establish an appropriate financial mechanism to assure the proper performance of post-closure monitoring and maintenance as provided in this permit, for a period of 30 years after closure. The selection of the particular financial mechanism shall be subject to the approval of the Department. The permittee shall provide written evidence of such financial mechanism to the Department.

5. As to each of the financial mechanisms described in Conditions 1 through 4 above, in the event that applicable federal or state law or regulations mandate additional or different requirements or longer time periods of financial coverage for monitoring and maintenance by the permittee, payments by the permittee and the financial arrangements described above are to be adjusted accordingly. The permittee shall annually reevaluate closure and post-closure costs and advise the Department of any changes required thereby in the financial mechanisms.

6. The permittee shall submit, within 60 days of the issuance of the permit, a cost estimate of effective oversight and implementation of the MMCP and fulfillment of all other permit conditions. This estimate must be based on a computation of supply and personnel costs for a specific number of monitors. The number of monitors must be determined on the basis of optimal monitoring capacity and shall in no event be less than three. The cost estimate is subject to Departmental approval. Upon approval, funds sufficient to meet the estimated costs must be submitted by the permittee to the Department within 30 days, and annually thereafter. Monitors shall be appointed by the Department, after consultation with local officials of the Towns of Lewiston and Porter, on the basis of merit.

7. A comprehensive projection for a 10 year period shall be submitted within 1 year of the issuance date of this permit. The projection (or plan) shall include site development, proposed modifications to existing operations, and new operations or facilities, for the site. Details shall cover their projected useful life, relation to other site uses, kinds of wastes processed and timing of events.

8. A Monitoring, Maintenance and Contingency Plan (MMCP) shall be submitted to the Department for approval within 60 days of the issuance date of this permit. The MMCP shall include both pre-closure and post-closure monitoring and maintenance programs, and a contingency plan setting forth in detail proposals for corrective or remedial action to be taken in the event of equipment breakdowns, ground or surface water or air contamination attributable to the facility's operation, fires and spills or releases of hazardous or toxic materials. The monitoring program shall cover surface water quality, groundwater quality and hydrology for every potential water bearing zone beneath the facility, internal leachate levels, leachate sampling and analysis levels in all lagoons and tanks, and air quality and shall be of sufficient detail to demonstrate the compliance with water and air quality criteria, design standards, and permit conditions. This monitoring program shall include locations upstream and downstream of each separate site operation such as: waste water treatment, secure landfilling sites, fuel blending, flash distillation, salts area, drum storage, as well as the whole facility. The MMCP shall include sampling schedules, sampling methods, analytical parameters, and other pertinent information. Maintenance shall include inspection and repair of all side slope and cover erosion and settling, cover vegetation, internal leachate withdrawal and treatment, surface drainage swales and appurtenances, all tanks, lagoons, storage areas, and other activities related to containment of on-site wastes. The contingencies would include remedial action for escaped wastes below, on, or above the site that the monitoring program may reveal and should also include remedial action for disasters, such as fires.

9. The permittee shall comply with any technical or administrative requirements in regulations to be promulgated by New York State under the authority of the Industrial Hazardous Wastes Management Act of 1978 (the Environmental Conservation Law Article 27, Title 9). Included, but not limited hereto, would be compliance with any hazardous waste manifesting requirements.

10. If a practicable alternative method of processing, reclaiming, or destruction becomes available for a specific waste, the permittee shall pursue with the Department the feasibility of using such an alternative method. If a method of destruction becomes available, for a specific waste of long term concern, approval may be withdrawn to landfill that waste at any time.

11. The existing ground and surface water monitoring program shall continue as modified in the individual engineering reports submitted as part of the application for this permit until the MMCP is approved. Newly established sampling points to be generated by the MMCP shall be installed within 60 days of that plan's approval,

12. The permittee shall allow inspections of physical facilities and non-confidential records and reports by duly authorized and appointed inspectors from the Towns of Lewiston and Porter and Niagara County.

13. Inspection by responsible local fire companies or fire departments shall be arranged and a report by each fire company or department on such inspections or drills, with recommendations, shall be submitted by the permittee, within 90 days of the issuance date of this permit, and semi-annually thereafter. The permittee must solicit recommendations from the fire companies or departments concerning minimum suggested inventories for firefighting and safety equipment to be maintained at the site.

14. An inventory sheet shall be distributed to all appropriate personnel and maintained at the main gate, or a place under continuous observation, that lists the amount and location of emergency equipment available on-site. At the same place and posted at other strategic locations, shall be a list delineating telephone numbers and contact persons representing companies that are available day and night to provide manpower or equipment for emergency situations.

15. All facilities and processes shall be operated in strict conformance with the operations report for the SCA Chemical Services, Inc., Model City, New York Facility, dated February 1979, except as modified by specific permit conditions.

16. An approvable comprehensive plan for surface water run-off and drainage control shall be submitted within 90 days of the issuance date of this permit. The plan should address, at a minimum, continuous monitoring and 100 year storm event containment. Upon Department approval, said plan shall be implemented prior to January 1, 1982.

17. A report describing general drum crusher operating instructions and procedures shall be submitted prior to commencement of drum crushing operations. The report shall include safety, handling, draining, and rinsing procedures.

18. No waste oil is to be used for dust control or otherwise spread on-site.

19. Operation of the facility shall not cause ambient air quality standards as specified in 6 NYCRR Part 257 to be exceeded.

20. The idled salts lagoons shall be eliminated by January 1, 1983, unless a report has been submitted and accepted by the Department, demonstrating that there is no significant adverse impact on ground or surface water caused by continued operation. If the salts areas are to be used beyond January 1, 1983, the permittee shall submit detailed engineering plans and reports for continued operation of the salts areas for Departmental approval.

21. Vehicles entering a secure landburial facility, salts blending area, drum storage area, or any other process area either coming in contact with wastes therein, or having been contaminated with waste products delivered, shall be cleaned of all such material prior to leaving the SCA properties. Vehicles or any other equipment which have entered a secure landburial facility or any area where they may come into direct contact with wastes, shall be inspected for gross contamination prior to leaving such a secure landburial facility or other area. Gross contamination on wheels or trucks shall by physically removed before leaving a secure landburial facility or other area to prevent contamination of on-site roads leading to the truck wash facilities. Commuter vehicles shall be exclusively restricted from entering process areas or otherwise coming in direct contact with any wastes.

22. The permittee shall require all waste haulers utilizing the Model City site to provide evidence to management that they possess valid waste hauler permits. Violations noted shall be documented by the permittee and reported to the on-site inspectors representing the Department.

23. Within 6 months of the issuance date of this permit, the permittee shall develop a plan and schedule to train personnel including drivers concerning safety procedures. Addressed should be those procedures to be followed in the event of a spill, as well as those to be followed while unloading and loading at the process areas.

24. Within 6 months of the issuance of this permit, all appropriate SCA personnel shall have successfully completed a hazardous waste training program in accordance with requirements specified in Section 264.16 "Personnel Training", 40 CFR Part 264.

25. The decision on a method for controlling potential odor emissions or leakage from open lagoons or tankage in the waste water treatment system shall be made and a proposal implementing that decision shall be submitted to the Department by August 1, 1981.

26. When closure of a facility or process area involves removal of contaminated soil, the permittee shall collect and document locations of soil samples taken to verify that all such contaminated soils have been appropriately removed.

27. The current inventory of wastes or non-salable products, for which no on-site method of disposal exists, shall be disposed of in a manner acceptable to the Department according to the following schedule:

    a. On-site drums except PCBs by January 1, 1982;

    b. On-site tankage by January 1, 1983;

    c. PCB liquids by permit expiration.

    The cost for such disposal shall be included in the MMCP. Quarterly progress reports shall be submitted to the Department and to the Niagara County Health Department.

28. The permittee shall verify that all active and inactive utility pipes or trenches do not serve as conduits for off-site migration of contaminants. The permittee shall submit to the Department a map, certified by a New York State Registered Professional Engineer, delineating the locations and specifying the conditions of such inactive utility pipes or trenches.

29. No machinery which is routinely used for site operations shall be permitted in the flammable cell, flammable storage areas, or any process area where a flammable atmosphere exists unless it has been fitted with safeguard devices required for a GS, LPS, or DS classification by Underwriters Laboratories, such classifications to be certified by an authorized representative of UL. Drum handling appurtenances shall be made spark resistent.

30. A construction schedule shall be prepared and submitted to the Department 30 days before any construction of permitted facilities is scheduled to begin. Activity scheduling shall provide a reasonable opportunity for supplemental inspection by Department staff prior to burying or otherwise obscuring the work. Schedules shall be revised when necessary, and all revisions should accompany the weekly construction reports. Earthwork construction shall not be performed before April 1st or after November 30th or during any other times of adverse condition without written approval from the Department. If earthwork construction must be performed during that period, the permittee shall submit a request for winter construction. This request shall include, but not be limited to, a revised construction schedule, a statement of prevailing weather conditions, special construction procedures that will be followed because of winter weather, and a meteorologic forecast from the National Weather Service covering the entire proposed winter construction period.

31. The permittee shall, within 3 months from the date of issuance of this permit, revise and submit the SPCC plan to demonstrate to the Department that all operating portions of the facility are located at an elevation not less than five feet above a flood plain unless provisions have been made to prevent the encroachment of flood waters in accordance with 6 NYCRR Part 360.8 (b)(2)(ii)(j).

32. A code identifying the method of disposal of each waste lot, where it is disposed, conditions of disposal, and degree of hazard from re-activity, toxicity and flammability shall be developed. Such codes shall identify, for secure landfill candidates, the cell, area segregation and cover requirements. It shall also identify wastes intended for disposal by treatment in the aqueous system, recycling by the fuels program, or by distillation. The coding system shall be submitted for Departmental review by September 1, 1981.

33. The permittee shall by January 1, 1982 provide proof to the Department (or a schedule for bringing into compliance) that the flash distillation and fuels blending areas are in complete compliance with all accepted codes, (i.e. NFPA, OSHA, ASME boiler codes, etc.,) and practices adhered to by the chemical process industry concerning fire safety devices and design.

34. By September 1, 1981, the permittee shall submit to the Department a report addressing vapor emissions potential from the flash distillation vacuum source vent under conditions of a maximum cooling water temperature, maximum boil-up rate, maximum vacuum, and establish a leakage rate. Leakage shall be determined semi- annually.

35. The permittee shall submit by August 1, 1981 a proposal which details controls for limiting the solvent content of residuals from flash distillation that are to be landfilled.

36. All waste drums stored on-site shall be stored on hard surface areas sloped to sumps by April 1, 1982. Existing earthen drum storage areas shall be eliminated by July 1, 1982 and covered in the MMCP. The permittee shall formally submit a plan and schedule within six months from the date of this permit issuance that addresses drum storage building as proposed.

37. Permittee shall maintain aerators of sufficient capacity to minimize odorous emissions at the aqueous storage facility. Sufficient back-up aerators shall be stored at the facility to provide immediate replacement of any non-functioning unit.

38. Transfers of waste water prior to and including the transfer to facultative Ponds 1 and 2 shall be via rigid piping after January 1, 1983.

39. Discharge pumping rate from any above ground earthen storage lagoon shall not cause a drawdown in excess of four inches (4") per day, unless required by emergency conditions.

40. The permittee shall provide site access to representatives of the Department or Niagara County Health Department for the purposes of assisting on-site Department inspectors in investigating the occurrence of odors suspected of being attributable to permittees facility.

41. The permittee shall monitor and report on a monthly basis the leachate in each standpipe of the landfills for level, pH, and TOC. Metals analysis shall be provided on a quarterly basis and Gas Chromatographic Scan annually for each sub-cell. Air monitoring of standpipes and vents shall be performed annually during periods of lower than average annual barometric pressure. The barometric pressure must also be falling when samples are obtained.

42. A monthly composite of fuels produced shall be analyzed and results submitted to the Department for sulphur, total and organic chlorine, PCBs, mercury and lead.

    The permittee shall submit to the Department on a monthly basis a list of customers receiving fuels (with the volume they receive) over the past month and those who will receive fuels during the next month.

43. By January 1, 1982, the permittee shall submit a report on feasibility of converting the ammonia stripping operation currently carried out in Lagoon 6 to an enclosed system with vapor control.

44. The permittee shall provide by January 1, 1983 improved solids separation in the waste water treatment systems so that heavy metal sludges are produced in a form suitable for direct secure landburial.

45. Anytime reports, plans, schedules or other documents are requested by permit conditions or by the USEPA, such reports are to be submitted to the NYSDEC Division of Solid Waste, Albany and Region 9 Office, as well as to Niagara County Health Department.

46. Hazardous wastes, as defined by 40 CFR Part 261, which contain any of the organic substances listed in 40 CFR 261.33 (e) shall not be landfilled by the permittee after January 1, 1985.

47. The permittee shall submit to the Department a schedule for dewatering Landfills 1-6. All landfills are to be dewatered by July 1, 1982, so as to be in compliance with a 2' innage limitation previously referenced. The permittee shall demonstrate to the Department, after 3 months of pumping data has been obtained, that such a schedule will be met. If the permittee cannot meet this schedule, a plan shall be submitted for Departmental review addressing the need for additional standpipes or other structures to facilitate the dewatering so that the July 1, 1982 deadline will be met. Landfill sites 1-5 shall be crowned by the construction of one or more apexes, each of which slopes at a minimum of 5% grade toward a run-off drainage ditch having a minimum of 1% grade. The cap shall consist of materials and thicknesses as approved for Secure Landfill #7, unless the permittee can demonstrate that the

permeability of the waste salts or other fill is sufficiently low to allow modification of the above. By December 1, 1981, all landfill exteriors shall be stabilized by constructing 3:1 (horizontal: vertical) side slopes with properly designed positive drainage paths across the top and down the slopes unless the permittee can demonstrate that an alternative design is superior. By December 1, 1982, construction of the final cover as specified above, except for sodding and seeding, shall be completed.

48. The organizational charts, diagrams 5-1 and 5-2 in the Operations Report, shall be revised to reflect names and other pertinent information about employees occupying those positions.

Said charts shall be updated as necessary to reflect any changes.

NOTICE OF PERMIT

for:

☐ CONSTRUCTION ☐ INITIAL ISSUE ☐ REISSUANCE
☒ OPERATION ☐ RENEWAL ☐ MODIFICATION

has been issued to: SCA Chemical Services, Inc.

address: 1550 Balmer Road, Model City, NY 14107

for a project described as: Model City Facility

under the Environmental Conservation Law,
Article 27, Title 5, Part 360 (Solid Waste Management Facilities)

NOTE:
- This Notice of Permit must be posted on the project site in such a manner that it is protected from weather and is in a location readily visible to the public.
- A copy of the Permit with the general and special conditions noted thereon will be shown to anyone upon request.

John L. Beecher, P.E.
Issuing Officer

600 Delaware Avenue, Buffalo, New York 14202
Address

2343	5/1/81	5/[illegible]
Permit No.	Issue Date	Expiration Date

New York State
Department of Environmental Conservation

47-12-2 (8/77)

PERMIT

Under the Environmental Conservation Law, Article 27, Title 7, Part 360

EXPIRATION DATE
October 27, 198

☐ CONSTRUCTION ☒ OPERATION

☐ INITIAL ISSUE ☐ RENEWAL

☐ REISSUANCE ☐ MODIFICATION

MIT ISSUED TO: O Waste Systems, Inc
agara Recycling, Inc. &NEWCO Chemical Waste Systems, Inc.

ADDRESS OF PERMITTEE: 4626 Royal Ave., Niagara Falls, NY

TELEPHONE NO.: 716/278-1811

CATION OF PROJECT: Town Niagara & City of Niagara Falls

County: Niagara

Environmental Conservation Regional Office: Region 9, 584 Delaware Ave., Buffalo, NY 14

SCRIPTION OF PROJECT: ne Avenue/Packard Road Facility

ON SITE SUPERVISOR: David Hanson

GENERAL CONDITIONS

1. The permittee shall file in the office of the Environmental Conservation Region specified above, a notice on intention to commence work at least 48 hours in advance of the time of commencement and shall also notify said office promptly in writing of the completion of the work.
2. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation who may order the work suspended if the public interest so requires.
3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.
4. All work carried out under this permit shall conform to the appro plans and specifications. Any amendments must be approved by Department of Environmental Conservation prior to their impleme tation.
5. The permittee is responsible for obtaining any other permits, a provals, easements and rights-of-way which may be required this project.
6. By acceptance of this permit, the permittee agrees that the permit contingent upon strict compliance with Part 360 and the spe conditions. Any variances granted by the Department of Environment Conservation to Part 360 must be in writing and attached hereto.

SPECIAL CONDITIONS

This Permit to Operate shall apply to the following permit applications; Permit to Operate Facility ID No. 32B20 (scrap metal, foundry sand metal recovery, lime excavation, and neutralization and general site); Permit to Operate Facility ID No. 32B21 (Secure Landburial Facility #2); Permit to Operate Facility ID No. 32B22 (Intermediate Landfill). Permit to Operate Facility ID No. 32B23 (Wastewater Treatment); Permit to Operate Facility ID No. 32S11 (Sanitary Landfill); and Permit to Operate Facility ID No. 32B24 (Secure Landburial Facility No. 3) and shall apply only to the facilities located on Pine Avenue and Packard Road unless otherwise noted.

DATE: r 27, 1979

ISSUING OFFICER: John C. McMahon, P.E.

SIGNATURE: X

B. * Pine Avenue/Packard Road Facility, Facility I.D. No. 32B20

The special conditions contained herein shall apply to all parts of the facility as listed in A preceding and further identified in C, D, E, F and G following.

1. Liability Insurance-The Permittee shall maintain insurance in amounts of $5 million per occurrence and with a $10 million annual aggregate for claims arising from the gradual release or escape of hazardous waste. The Permittee shall maintain its liability insurance policy with coverage of $2 million per occurrence and $10 million total for sudden or accidental occurrence involving escape or release of hazardous waste. The Permittee shall provide within 60 days of the effective date of this permit, written evidence of these insurance policies, in a form acceptable to the Department. In addition, the Permittee shall provide annually during site operation, commencing on the date one year after the effective date of this permit, written evidence that it is maintaining the total coverage described in this condition.

2. Concerning pre-closure monitoring and maintenance, the Permittee shall provide, within 60 days of the effective date of this permit, a cost estimate for those parts of the Monitoring, Maintenance, and Contingency Plan (condition 8 below) which cover monitoring and maintenance activities as to operating facilities on the site. Within 30 days after the Department's approval of this cost estimate, the Permittee shall secure a performance bond in the amount of such estimate, and shall maintain said performance bond for the life of the facilities permitted hereunder, and shall provide written evidence of such bond to the Department. In addition, the Permittee shall provide annually during site operation, commencing on the date one year after the effective date of this permit, written evidence that it is maintaining the performance bond described in this condition.

3. In respect to the closure of facilities, the Permittee shall, within 60 days of the effective date of this permit, provide the Department with a detailed estimate of the cost of its closure plans for each operating facility on site, the name of a proposed financial institution to serve as a fund administrator, and a proposed trust instrument for fund administration. The trust instrument is to provide for disbursement to the Department in the event of failure by the Permittee to properly close each specified facility. Within 30 days after the Department's approval of cost estimate, institution, and instrument, the Permittee shall execute the approved instrument and make deposit of the approved amount. Upon the Department's approval of successful completion of closure of any specific facility, the Department shall approve reimbursement to the Permittee of the unexpended sum attributable to that facility (together with accrued interest thereon).

4. Concerning post-closure monitoring and maintenance, the Permittee shall submit, within 60 days of the effective date of this permit, a 20 year cost estimate for those parts of the Monitoring, Maintenance and Contingency Plan (MMCP) covering post-closure monitoring and maintenance activities, as to facilities already closed and to become closed, and an estimate of the annual payments during the period of the pre-closure operation of such facilities necessary to generate a fund which, at the time of closure or the end of the permit term, whichever is sooner, will be sufficient to cover the required implementation for 20 years after closure. The same fund establishment and administration procedure described above for site closure is to be followed in this instance, except that the deposits to be made shall be semi-annual, and the reimbursement to the Permittee shall similarly be semi-annual.

5. As to each of the funds described in conditions 1, 2, 3 and 4 above, in the event that applicable federal or state law or regulations mandate additional requirements or longer time periods of financial coverage for monitoring and maintenance by the Permittee, payments by the Permittee and the financial arrangements described above are to be adjusted accordingly.

6. The Permittee shall annually provide not less than $80,000 and reasonably suitable working space on-site, for the services of personnel to be secured, and supervised by the Department to insure satisfactory implementation of the MMCP and the fulfillment of all other permit conditions. The sum of $80,000 shall be submitted to the Department, within 30 days of the effective date of this permit and annually on the effective date of this permit thereafter.

7. A comprehensive projection for a ten-year period shall be submitted by January 2, 1980. The projection (or plan) shall include site development, proposed modifications to existing operations, and new operations or facilities for the site and the Buffalo Avenue Site in Niagara Falls. The detail shall cover their projected useful life, relation to other site uses, kinds of wastes processed and timing of events. The Department's approval of this ten year plan is a prerequisite for the processing of any future specific permit application submitted by the applicant.

8. A Monitoring, Maintenance and Contingency Plan (MMCP) shall be submitted to the Department for approval by January 2, 1980. The MMCP shall include both a preclosure monitoring program and maintenance program, and contingency plan. The monitoring program shall cover surface water quality, groundwater quality and hydrology, internal leachate levels, levels in all lagoons and tanks, and air quality and shall be of sufficient detail to demonstrate the compliance with water and air quality criteria, design standards, and permit conditions. This monitoring program shall include locations upstream and downstream of each separate site operation such as: wastewater treatment-upper (L-1 through L-5), wastewater treatment-lower (L-5 through L-11), secure landfilling (SLF-1, SLF-2 and SLF-3), intermediate landfill, sanitary landfill, HCl acid neutralization lagoons, lime reclamation, metal recovery from foundry sand, and scrap metal recovery, as well as for the whole facility. The MMCP shall include sampling schedules, sampling methods and other pertinent information. Maintenance shall include inspection and repair of all side slope and cover erosion and settling, cover vegetation, internal leachate withdrawal and treatment, surface drainage swales and appertenances, all tanks, lagoons, drying beds and storage areas, and other activities related to containment of on-site waste. The contingencies would include remedial action for escaped wastes below, on or above the site that the monitoring program may reveal and should also include remedial action for disasters such as fires.

9. Operation of Secure Landfill No. 3 shall not be initiated prior to fulfilling conditions 1, 2, 3, 4, 5, 6, 7, and 8 above.

10. The existing ground and surface water monitoring program shall continue as modified in the individual engineering report until the MMCP is approved. Sampling of any newly established sampling point shall be initiated within one month of installation.

11. Inspection by the responsible local fire companies or fire department shall be arranged and a report by each fire company or department on such inspections or drills with recommendations shall be submitted by the Permittee by January 2, 1980, and semi-annually thereafter.

12. All facilities, including HCL neutralization and resource recovery facilities, shall be operated in strict conformance with the plans and reports dated April 30, 1979 and titled Facilities Operation Plant except as modified by other permit conditions.

X 13. Surface run-off from the scrap metal recovery operations shall be monitored for oil and grease and reported to the Department. Run-off monitoring and reporting shall be addressed in the MMCP.

X 14. An approvable program for remedial work for surface water run-off control from the scrap metal recovery area, based on monitoring results shall be submitted by January 2, 1980.

X 15. A 30 day plan for monitoring and reporting surface water run-off from the foundry sand metal recovery are , capable of distinguishing true or apparent phenol, shall be submitted by December 1, 1979.

X 16. An approvable program to monitor and report on effluent quality from the acid neutralization ponds with a comparison to existing groundwater standards shall be included in the MMCP.

17. Drainage ditches shall be repaired or reconstructed to eliminate free standing water.

18. Drums stored at the drum crusher shall be segregated in rows a maximum of two drums high, arranged to allow inspection readily; and arranged to prevent comingling of wastes of hazardous potential.

19. Both the stored lime surfaces and the faces of lime excavations shall be stabilized to prevent dust in accordance with an approvable proposal to be submitted by January 2, 1980, for positive lime dust control.

20. The drainage channel running around the north, east, and southeast boundry of the facility shall be reconstructed to improve drainage flow and quality. The wetland shall not be disturbed directly or caused to be drained. A plan for this reconstruction shall be submitted to the Department for approval by May 1, 1980 and said plan shall be implemented within 60 days of such approval.

21. No waste oil is to be used for dust control or otherwise spread on-site until such oil has been analyzed and found free of PCB's and other toxic organics in detectable amounts.

22. Operation of the facility shall not cause ambient air quality standards as specified in 6NYCRR Part 257 to be exceeded.

23. All operations conducted on-site shall be conducted in such a manner and in such locations as to not cause continued violations of the SPDES permit.

24. The Hydrochloric Acid Neutralization Facility shall be eliminated within eighteen (18) months of the date of issuance of this permit, unless a report has been submitted and accepted by the Department demonstrating that there is no significant adverse impact on site hydrogeology caused by continued operation.

25. The leachate withdrawal system and program from Secure Landburial Facility #1 shall be modified as follows:

a. Leachate levels in the standpipes shall be monitored and pumped automatically utilizing permanetly installed sensors, pumping equipment and receiving vessels as specified in the MMCP. Dual leachate pumps shall be provided, each to serve as stand-by for the other and automatically controlled to operate independently or together. Leachate pumps shall be fitted with power failure and high leachate level indicator alarms centrally located at a place of continual, if not continuous, attendance.

b. Maximum leachate level at the leachate pumps shall not exceed two (2) feet above the lowest elevation of the floor of the area being drained. Inner leachate withdrawal operations are to begin when an action level of twelve (12) inches innage is reached or as specified in the Department approved MMCP.

C. Secure Landfill Facility No. 2, Facility I.D. No. 32B22

The following special conditions shall apply to Secure Landburial Facility #2 (Facility Identification Number 32B22).

1. All special conditions contained in Permit Number 2208, Permit to Operate Secure Landburial Facility #2, as issued by the Department on June 8, 1978 shall remain in effect.

2. All subsequent modifications and approvals issued in writing by the Department to special condition #1 above shall remain in effect.

3. After landfill closure, leachate levels in the standpipes shall be monitored and pumped automatically utilizing permanently installed sensors, pumping equipment and receiving vessels as specified in the MMCP. Dual leachate pumps shall be provided, each to serve as standby for the other and automatically controlled to operate independently or together. Leachate pumps shall be fitted with power failure and high leachate level indicator alarms centrally located at a place of continual, if not continuous, attendance.

4. Maximum leachate level at the leachate pumps shall not exceed two (2) feet above the lowest elevation of the floor of the area being drained. Inner leachate withdrawal operations are to begin when an action level of twelve (12) inches innage is reached or as specified in the Department approved MMCP.

5. The Permittee shall submit a New York State Licensed P.E.'s written certification, including as-built drawings, that the closure construction is in accordance with approved report, plans, drawings and specifications.

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D. Intermediate Landfill (ILF), Facility I.D. No. 32B22.

The following special conditions shall apply to the Intermediate Landfill and sludge drying beds (Facility Identification #32B22).

1. This Sludge Management Facility (Intermediate Landfill No. 1 and sludge drying beds) shall be operated in strict conformance with the plans and report dated May 4, 1978 as amended August 8, 1978 and October 9, 1979 except as noted below.

2. All wastes shall be approved by the Department prior to delivery. Information provided in the request for approval shall include, as a minimum, the physical and chemical state of each waste stream, the method by which the waste is to be handled, and identify which subcell the waste is intended to be disposed in. The following limitations shall apply to all wastes intended for disposal within the Intermediate Landfill:

a. No waste shall be placed into the Intermediate Landfill which contains any combination of Group I controlled contaminants (as defined on page 133 and 134 of the engineering report) expressed as metal in any chemical form in excess of ten percent by weight on a dry weight basis and which contains Group I divalent metals such as Co, Cu, Pb, Ni, Zn in excess of 5.0% dry weight basis.

b. No waste shall be placed into the Intermediate Landfill which contains any combination of Group II and III controlled contaminants (as defined on pages 134 and 135 of the engineering report) expressed as metal in any chemical form in excess of 0.01% by weight on a dry weight basis.

c. No waste shall be placed into the Intermediate Landfill which contains any combination of water soluble group I controlled contaminants expressed as metal in excess of 0.005% by weight on a dry weight basis.

d. No waste shall be placed into the Intermediate Landfill which contains any combination of water soluble group II or III controlled contaminants expressed as metal in excess of 0.0005% by weight on a dry weight basis.

e. No waste shall be placed into the Intermediate Landfill which contains a combination of mercury and cadmium in any chemical form expressed as metal exceeding 0.05% by weight on a dry weight basis.

f. All wastes as placed shall be capable of maintaining a minimum load bearing capacity of 150 pounds per square foot.

3. The quantity and quality of all leachate removed from the Intermediate Landfill shall be reported to the Department of Environmental Conservation and the Niagara County Health Department monthly. The method of disposal of the leachate shall be submitted to the Department for approval.

4. The Permittee shall submit a professional engineering evaluation by a recognized soils expert (or firm) to demonstrate the adequacy of the construction, the impact of exterior groundwaters on construction and the ability of the facility to contain leachate. The submission may include progress reports and shall be completed coincident with the completion of construction.

5. During the operational phase, within one (1) week of the completion of each lift of clay of the sidewalls, the applicant shall submit a written certification by a New York State Licensed Professional Engineer that the lift was constructed in accordance with the approved plans and report, providing soils data for that lift as constructed.

6. Landfilling shall be discontinued in any cell in which a loss of hydraulic communication with the underdrain occurs. If communication cannot be re-established, that cell is to be closed.

7. The associated drying beds shall be closed concurrent with the closure of the Intermediate Landfill unless there is an approvable submission detailing the continued operation.

8. The Permittee shall submit a P.E.'s written certification, including as-built drawings, that the closure construction is in accordance with approved report, plans, drawings and specifications.

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E. Wastewater Treatment Plant, Facility I.D. No. 32B24

The following special conditions shall apply to the Wastewater Treatment Plant (Facility Identification #32B24).

1. Operation shall be in strict accordance with the revised report and plans dated September 6, 1978, except as noted below.

2. The discharge of concentrated sulfuric acid into receiving lagoon L-1 shall be via eductor in the recirculating line from pump, P1. The recirculating line shall discharge subsurface.

3. A method of dewatering or solidifying sludges for approved landfilling shall be provided. Plan and report addendum shall be submitted to the Department of Environmental Conservation for approval within three (3) months from the issuance of this permit.

4. The discharge shall comply with the following limits.

    a. TOC ≤ 1,000 mg/l — If the Niagara Falls Wastewater Treatment Plant is not able to meet permit limits for COD reduction, concentration or mass discharge SPDES limits with the carbon columns operational, the TOC limit is subject to future reduction.

    b. Flow ≤ 20,000 gph
    c. TOH ≤ 75 μg/l (or THO as lindane ≤ 100 μg/l)
    d. COD (S) ≤ 1300 lbs/day average
    e. SS ≤ 2190 lbs/day average
    f. Phenols ≤ 1.0 mg/l maximum
    g. Organic phosphorous ≤ 0.5 mg/l maximum
    h. pH to be maintained between 5.0 and 9.0
    i. Toxic Materials-No discharge of materials would damage the N.F. WWTP or personnel or which after treatment, constitute a hazard to human or animal life in receiving waters.

5. Discharge monitoring shall comply with requirements of the Niagara Falls Department of Utilities and is subject to modification based upon incoming receipts. Monitoring shall be as follows:

    a. Each batch shall be monitored for total organic halogen (TOH) or total halogenated organic (THO), TOC and pH.

    b. A monthly composite shall be monitored for heavy metals, including copper and mercury, and for phenol, and organic phosphorous. The monthly composite shall be made-up of a proportional aliquot of each batch.

c. An initial one-month composite shall be analyzed by gas chromatography with mass spectroscopy (GC-MS). Further, a one-month composite every six months shall be screened by approved gas chromatographic methods and compared to the initial composite. GC-MS analyses shall be performed if new peaks are detected in the scan or existing peaks increase by 50%.

6. The Permittee shall submit approval proposals for all new waste streams containing toxic organic compounds prior to the wastes arrival on site. The proposals shall include a waste specific monitoring program to include (but not limited to) waste characteristics, potential air emissions, treatment efficiencies through each unit of the flow train, sludge routing and provisions for analysis by gas chromatography with mass spectroscopy.

7. No waste stream is to be accepted which is likely to release noxious odors or irritating fumes from the process equipment or contain metal chelates which will interfere with metal precipitation. No waste stream shall be accepted which will have a detrimental effect on unit operations or waste treatment efficiencies or cause generation of a sludge not compatible with approved disposal methods.

8. Records must be made available after start-up for inspection by the Niagara County Health Department or the Department of Environmental Conservation to confirm the feed rate concentrations to each of the wastewater treatment units.

9. Air sampling and/or material balance calculations shall be performed consistent with the MMCP to confirm potential and actual emissions from emission points are in compliance with the provisions of 6NYCRR 201, 212 and 231.

10. L-1, the reducing lagoon, Lagoons L-2, 3 and 4 shall be dewatered semi-annually for inspections, or as the Department specifies. All inspections are by the Department or its agents. The Department shall be notified one week in advance of anticipated inspection dates.

11. Future additions shown on NCD-67, such as polymer addition to Lagoon L-5 and oxidant addition to oxidizing lagoon L-6 shall be submitted for approval prior to installation.

12. Inflow and withdrawal from Lagoons 2, 3 and 4 and aeration in Lagoon 3 shall be operated in a manner which will not disturb the clay liner.

13. Monthly discharge reports shall be submitted to the City, the Niagara County Health Department and to the Department's Region 9 Office and Central Office. Monthly averages and monthly maximum shall be included in the report. The report due date is the 28th day of the following month.

14. Leachate treatment shall be given priority over the treatment of off-site generated wastes as necessary to maintain permitted levels of leachate within on-site secure and intermediate landfills.

* * *

F. Secure Landburial Facility No. 3, Facility I.D. No. 32B24

The following special conditions shall apply to Secure Landfill #3 (Facility Identification #32B24). This permit to operate Secure Landfill #3 shall be effective only upon written notification by the Department. Said notification shall be issued only after compliance with the Permit to Construct Secure Landfill #3.

1. Secure Landfill #3 shall be constructed and operated in strict conformance with the plan and report originally dated Feburary 27, 1979 and updated May 25, 1979 as amended by the subsequent addendum dated July 7, 1979, except as modified by special conditions contained in this Permit.

2. Wastes are to be segregated by their chemical properties and covered by appropriate materials in accordance with Section 7 of the July 9, 1979 report addendum. Wastes are to be segregated into five major subcells and further segregated into isolated areas within the subcells. The wastes are to be segregated into five subcells as follows:

   a. Subcell I - The General Subcell: This subcell is to receive waste materials having contaminants described in Group VII and IX of the Controlled Contaminants. These wastes may include insignificant quantities or concentrations of Group I through IV contaminants.

   b. Subcell II - The Pseudometal Subcell. This subcell is to receive waste materials containing Group II, Pseudometal; Group III, Chalcogenic; and Group IV, Beryllium compounds. These compounds include compounds containing antimony, arsenic, beryllium, bismuth, phosphorous, selenium, and tellurium. Pseudometal compounds, to be landfilled, are to have a maximum solubility of 100 mg/l of the element when buffered to the pH 5-8 range. An appropriate buffer shall be incorporated in the daily cover to maintain subcell pH between 5 and 8. Alkaline sensitive wastes are to also be included in this subcell.

   c. Subcell III - The Heavy Metal Subcell. This subcell is to receive waste materials containing Group I of the Controlled Contaminants heavy metals and their salts. Heavy metals include: cadimum, chromium, copper, cobalt, barium, iron, lead, manganese, mercury, molybdenium, nickel, noble metals, strontium, thallium, tin, titanium, tungsten, zinc, zirconium, and vanadium. Very soluble salts such as cyanides and other soluble strong complexes shall be converted to insoluble forms prior to landfilling. Lime or other alkaline material, sufficient to buffer the subcell pH above 8.5 shall be included in the daily cover.

   d. Subcell IV - The Flammable Subcell. Wastes to be disposed in this subcell are those exhibiting a flash point between 80 and 130°F. Wastes which are strong oxidizing agents, or which are subject to spontaneous heating or which react with air or moisture to evolve heat are excluded from this subcell.

e. Subcell V - Double Secure Subcell. This subcell is to receive waste materials containing significant concentrations of toxic organic contaminants. Waste materials containing any specific organic compound in concentrations in excess of 2 percent by weight that are designated as "highly toxic" by The Condensed Chemical Dictionary, Hawley, Gessner G., Ninth Edition or labeled with a "severe toxicity" rating of three by any route in Dangerous Properties of Industrial Materials, Sax, Irving, Fourth Edition, are included in this subcell. Also included are known or suspected carcinogens, halogenated organics including wastes contaminated with PCB's; hard pesticides and their residues, and wastes contaminated with toxic organics determined or suspected of being environmentally persistent or bioaccumulative. Waste containing significant quantities or concentrations of solvents or other organics which would mobilize toxic organics and highly flammable wastes are to be excluded from this subcell.

3. Waste within each subcell shall be further segregated within each subcell by areas in accordance with the area segregation contained in Section 7 of the July 7, 1979 revision of the report. The specific cover material for each segregated waste group shall be as described in Section 7 of the July 7, 1979 revision of the report.

4. When a waste falls into more than one category, the containment of greatest concern because of its hazardous property and/or volume shall determine the subcell or area in which the waste shall be disposed. The Applicant shall submit approvable proposals to the Department for handling wastes that fall into more than one segregation category prior to the acceptance of any such waste at the site.

5. The "Waste Acceptance Criteria with Limitations and Restrictions" Section 6 of the February 27, 1979 report is to be strictly followed. The following limitations and restrictions shall apply.

a. A waste material containing any specific organic compound in concentrations in excess of 5 percent weight or exceeding an amount of 100 lbs. for that compound for the entire landfill, that is designated as "highly toxic" by The Condensed Chemical Dictionary, Hawley, Gessner, G., Ninth Edition, Van Nostrand Reinhold Company, or labelled with a "severe toxicity" rating of 3 by any route in Dangerous Properties of Industrial Materials, Sax, N. Irving, Fourth Edition, will require supplemental approval from the Department prior to that waste material's disposal in Secure Landfill #3.

b. A waste material containing any organic chemical designated by OSHA as a carcinogen, in concentrations in excess of 2 percent by weight, or exceeding a total of 100 lbs. for that organic OSHA carcinogen within SLF #3 will require supplemental approval from the Department prior to that waste materials disposal in Secure Landfill #3.

c. Waste materials containing the controlled contaminant components listed in Section 6 of the February 27, 1979 Engineering Report are not permitted for disposal in Secure Landfill #3 in any measurable quantities without supplemental approval from the Department.

d. Waste materials containing radioactive isotopes, explosives, shock sensitives, or pyrophoric substances are not permitted for disposal in Secure Landfill #3.

e. No wastes or waste mixture shall be placed or created in Secure Landfill #3 that possess an NFPA Reactivity Hazard Rating of 3 or greater.

f. No waste or waste mixture shall be placed or created in Secure Landfill #3 that possess an NFPA Flammability Hazard Rating of 3 or greater, furthermore:

1. No wastes with a flash point of less than 80°F are permitted in Secure Landfill #3.

2. No wastes from which natural biological activity may create within the Landfill chemical products having an NFPA Flammable Hazard Rating of 3 or greater are permitted in Secure Landfill #3.

6. No waste or antagonistic waste mixture shall be placed or produced in Secure Landfill #3 which possess the chemical or physical-chemical ability to penetrate the compacted clay and synthetic membrane liners.

7. No waste or waste combinations shall be placed in Secure Landfill #3 which are capable of generating gaseous contaminants considered to be unnatural to the environment or which contain controlled contaminants easily capable of becoming airborne, unless it is suitably containerized.

8. No waste or waste mixtures which possess a pour point under ambient operating temperatures shall be placed into Secure Landfill #3 unless it is suitably containerized.

9. No waste or waste mixtures which contain in excess of 15 percent by volume of free liquid at its infinite settling point shall be placed in Secure Landfill #3.

10. No containerized waste shall be placed in Secure Landfill #3 that contain in excess of 15 percent free fluid by volume at its infinite settling point.

11. Unless special cover components are provided to safely react with these types of contaminants to cause adsorption, precipitation, or

complexation, reducing solubility in situ, the following solubility limitations shall apply to all wastes or waste mixtures which may be placed or created in Secure Landfill #3.

a. Common Contaminant Components that have a solubility in water at 25°C in excess of 10 percent by weight without prior Department approval.

b. Group I and Group II Controlled Contaminants, and selenium, tellurium, and beryllium and their compounds that have a solubility in water at 25°C in excess of 0.05 percent by weight.

c. Hazardous oxidizers, inorganic acid sensitive anions, and acid or acid generating contaminants in excess of 2.0 percent by weight, or

d. Group III Controlled Contaminants that have a solubility in water at 25° in excess of 0.10 percent by weight.

12. Copies of daily grid work sheets are to be available during inspections and submitted weekly to the Niagara County Health Department. A concise waste description, adequately referenced in key form, shall be included in the report. A waste material recording and coding system with nomenclature, areas and waste descriptions compatible with the system used for SLF-2 shall be used.

13. Within one week of the completion of each increase in internal berm height to accommodate an additional layer of drums, a certification by a New York State License Professional Engineer with experience in soil engineering shall be submitted to the Department. Said certification shall include soild data and verification that the berm was constructed in accordance with approved plans.

14. Maximum leachate level at the leachate pumps shall not exceed two (2) feet above the lowest elevation of the floor of the area being drained. Inner leachate withdrawal operations are to begin when an action level of twelve (12) inches innage is reached or as specified in the Department approved MMCP.

15. The internal leachate shall be incinerated or treated in a system approved in writing by the Department for the treatment of leachate. No waste materials or antagonistic waste mixtures shall be placed or produced in the Secure Landfill #3 that result in leachate which cannot be treated effectively.

16. Placement of intermediate cover material shall be accomplished in such a manner as to minimize void space between drums.

17. If a practical alternative method of processing, reclaining or destruction becomes available for a specific waste, the Permittee should

pursue with the Department the feasibility of using such an alternative method. If a method of destruction becomes available for a specific waste of long-term concern, approval may be withdrawn to landfill that waste at that time.

18. Standpipes are to be covered at all times during site operation (except when pumping leachate) and after closure.

19. Exterior and interior side slopes forming Secure Landfill #3 shall be inspected monthly for slumpage, erosion and other structural problems. All observed problems shall be reported to the Department within 24 hours.

20. After landfill closure, leachate levels in the standpipes shall be monitored and pumped automatically utilizing permanently installed sensors, pumping equipment and receiving vessels as specified in the MMCP. Dual leachate pumps shall be provided, each to serve as stand-by for the other and automatically controlled to operate independently or together. Leachate pumps shall be fitted with power failure and high leachate level indicator alarms centrally located at a place of continual, if not continuous, attendance.

21. The Permittee shall submit a P.E.'s written certification, including as-built drawings, that the closure construction is in accordance with approved report, plans, drawings and specifications.

22. Wastes contaminated with PCB's shall be stored and disposed of in accordance with Federal laws, regulations, permits and approvals.

* * *

G. Sanitary Landfill Facility, Facility I.D. No. 32S11

The following special conditions shall apply to the Sanitary Landfill Facility (Facility Identification #32S11).

1. The facility shall be operated in conformity with the Engineering Report entitled, "Niagara Recycling Sanitary Landfill Facility" dated February 28, 1979, the addendum forwarded March 7, 1979, and the Engineering Plans prepared by Gordon Soderholm, issue date May 8, 1979, entitled, "Sanitary Landfill Site, Niagara Recycling", except as modified by the following conditions.

2. In addition to the specific requirements set forth in Section 360.8, b (1), of 6NYCRR Part 360, the following shall apply.

   a. No side slopes in the sanitary landfill shall exceed three (3) horizontal to one (1) vertical.

   b. Permanent vegetative cover shall be established within one growing season following completion of side slope construction or completion of grading of final cover.

   c. No wastes shall be deposited or buried in any areas located within 50 feet of any property line.

3. Industrial waste types to be disposed shall be limited to items listed in Table 5, page 68 of the addendum; however, those industrial wastes that contain more than 10% free liquids or more than 2000 mg/l C.O.D. shall be diverted to the Intermediate Landfill.

4. Any portion of the landfill area that lies within 100 feet of the 100 year floodplain area shall be excluded from use as a landfill area.

5. Adequate methods of dust control will be implemented so as not to cause a nuisance or violate the ambient air quality standards of 6NYCRR 257 and be consistent with the MMCP.

6. Monitoring reporting as described in Section 4 of the Engineering Report shall be submitted to the New York State Department of Environmental Conservation - Division of Solid Waste Management - 50 Wolf Road, Albany, New York 12233 in addition to the authorities mentioned in Article VII of said Section 4 and consistent with the MMCP.

7. The final two feet of cover material shall be a satisfactory soil type that can support vigorous vegetative growth and shall be able to minimize surface water infiltration into the subsurface.

8. Volatile, toxic or hazardous wastes shall not be accepted in this sanitary landfill.

9. Upon completion of the sanitary landfill or at anytime, construction of any kind other than that shown on the plans or included in the Engineering Report shall not be permitted without written approval from the Department.

10. A site surface drainage collection system shall be constructed on the west side of the sanitary landfill to collect the surface run-off from the completed side slope and diverted to the 60th Street storm sewer. The leachate shall continue to be discharged to the ditch tributary to the 47th Street interceptor.

11. On each anniversary date of the permit, an annual facility inspection report (as described on page 53 of the report) shall be forwarded to the Department of Environmental Conservation Region 9 Office, and the Niagara County Health Department. Included in the report shall be the volume or weight of the wastes landfilled and the remaining capacity of the landfill.

12. Leachate collection and treatment shall be provided, if necessary, to comply with SPDES Permit No. NY0094251 for DSN002.

* * *

NOTICE OF PERMIT

for:

☐ CONSTRUCTION
☒ OPERATION

☐ INITIAL ISSUE
☐ RENEWAL

☐ REISSUANCE
☐ MODIFICATION

has been issued to: NEWCO Waste Systems, Inc., Niagara Recycling, Inc. NEWCO Chemical Waste Systems, :

address: 4626 Royal Avenue, Niagara Falls, New York

for a project described as: Operation of Pine Avenue/Packard Road Facility

under the Environmental Conservation Law,
Article 27, Title 5, Part 360 (Solid Waste Management Facilities)

NOTE:

- This Notice of Permit must be posted on the project site in such a manner that it is protected from weather and is in a location readily visible to the public.
- A copy of the Permit with the general and special conditions noted thereon will be shown to anyone upon request.

Issuing Officer

NYS Department of Environmental Conservation
584 Delaware Avenue , Buffalo, New York 14202
Address

New York State
Department of Environmental Conservation
47-12-2 (8/77)

2025
Permit No

October 27, 1979
Issue Date

October 27
[illegible]

PERMIT

Under the Environmental Conservation Law, Article 27, Title 7, Part 360

EXPIRATION DATE
October 27, 1981

☒ CONSTRUCTION ☐ INITIAL ISSUE ☐ REISSUANCE
☐ OPERATION ☐ RENEWAL ☐ MODIFICATION

RMIT ISSUED TO NEWCO Waste Systems, Inc.-
agara Recycling & NEWCO Chemical Waste Systems, Inc.

ADDRESS OF PERMITTEE
4626 Royal Avenue, Niagara Falls, NY

TELEPHONE NO.
716/278-1811

CATION OF PROJECT
Town: Niagara
County: Niagara

Environmental Conservation Regional Office
Region 9, 584 Delaware Ave., Buffalo, NY 14202

SCRIPTION OF PROJECT
care Landfill Number 3

ON-SITE SUPERVISOR
David Hanson

GENERAL CONDITIONS

1. The permittee shall file in the office of the Environmental Conservation Region specified above, a notice on intention to commence work at least 48 hours in advance of the time of commencement and shall also notify said office promptly in writing of the completion of the work.

2. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation who may order the work suspended if the public interest so requires.

3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.

4. All work carried out under this permit shall conform to the approved plans and specifications. Any amendments must be approved by the Department of Environmental Conservation prior to their implementation.

5. The permittee is responsible for obtaining any other permits, approvals, easements and rights-of-way which may be required for this project.

6. By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with Part 360 and the special conditions. Any variances granted by the Department of Environmental Conservation to Part 360 must be in writing and attached hereto.

SPECIAL CONDITIONS

Special conditions are contained on attached pages 2 through 8 inclusive.

E DATE
ober 27, 1979

ISSUING OFFICER
John C. McMahon, P.E.

SIGNATURE
X

Secure Landburial Facility No. 3, Facility I.D. No. 32B24

The following special conditions shall apply to Secure Landfill #3 (Facility Identification #32B24). This permit to operate Secure Landfill #3 shall be effective only upon written notification by the Department. Said notification shall be issued only after compliance with the Permit to Construct Secure Landfill #3.

1. Secure Landfill #3 shall be constructed and operated in strict conformance with the plan and report originally dated Feburary 27, 1979 and updated May 25, 1979 as amended by the subsequent addendum dated July 7, 1979, except as modified by special conditions contained in this Permit.

2. Wastes are to be segregated by their chemical properties and covered by appropriate materials in accordance with Section 7 of the July 9, 1979 report addendum. Wastes are to be segregated into five major subcells and further segregated into isolated areas within the subcells. The wastes are to be segregated into five subcells as follows:

   a. Subcell I - The General Subcell: This subcell is to receive waste materials having contaminants described in Group VII and IX of the Controlled Contaminants. These wastes may include insignificant quantities or concentrations of Group I through IV contaminants.

   b. Subcell II - The Pseudometal Subcell. This subcell is to receive waste materials containing Group II, Pseudometal; Group III, Chalcogenic; and Group IV, Beryllium compounds. These compounds include compounds containing antimony, arsenic, beryllium, bismuth, phosphorous, selenium, and tellurium. Pseudometal compounds, to be landfilled, are to have a maximum solubility of 100 mg/l of the element when buffered to the pH 5-8 range. An appropriate buffer shall be incorporated in the daily cover to maintain subcell pH between 5 and 8. Alkaline sensitive wastes are to also be included in this subcell.

   c. Subcell III - The Heavy Metal Subcell. This subcell is to receive waste materials containing Group I of the Controlled Contaminants heavy metals and their salts. Heavy metals include: cadinum, chromium, copper, cobalt, barium, iron, lead, manganese, mercury, molybdenium, nickel, noble metals, strontium, thallium, tin, titanium, tungsten, zinc, zirconium, and vanadium. Very soluble salts such as cyanides and other soluble strong complexes shall be converted to insoluble forms prior to landfilling. Lime or other alkaline material, sufficient to buffer the subcell pH above 8.5 shall be included in the daily cover.

   d. Subcell IV - The Flammable Subcell. Wastes to be disposed in this subcell are these exhibiting a flash point between 80 and 130°F. Wastes which are strong oxidizing agents, or which are subject to spontaneous heating or which react with air or moisture to evolve heat are excluded from this subcell.

e. Subcell V - Double Secure Subcell. This subcell is to receive waste materials containing significant concentrations of toxic organic contaminants. Waste materials containing any specific organic compound in concentrations in excess of 2 percent by weight that are designated as "highly toxic" by The Condensed Chemical Dictionary, Hawley, Gessner G., Ninth Edition or labeled with a "severe toxicity" rating of three by any route in Dangerous Properties of Industrial Materials, Sax, Irving, Fourth Edition, are included in this subcell. Also included are known or suspected carcinogens, halogenated organics including wastes contaminated with PCB's; hard pesticides and their residues, and wastes contaminated with toxic organics determined or suspected of being environmentally persistent or bioaccumulative. Waste containing significant quantities or concentrations of solvents or other organics which would mobilize toxic organics and highly flammable wastes are to be excluded from this subcell.

3. Waste within each subcell shall be further segregated within each subcell by areas in accordance with the area segregation contained in Section 7 of the July 7, 1979 revision of the report. The specific cover material for each segregated waste group shall be as described in Section 7 of the July 7, 1979 revision of the report.

4. When a waste falls into more than one category, the containment of greatest concern because of its hazardous property and/or volume shall determine the subcell or area in which the waste shall be disposed. The Applicant shall submit approvable proposals to the Department for handling wastes that fall into more than one segregation category prior to the acceptance of any such waste at the site.

5. The "Waste Acceptance Criteria with Limitations and Restrictions" Section 6 of the February 27, 1979 report is to be strictly followed. The following limitations and restrictions shall apply.

a. A waste material containing any specific organic compound in concentrations in excess of 5 percent weight or exceeding an amount of 100 lbs. for that compound for the entire landfill, that is designated as "highly toxic" by The Condensed Chemical Dictionary, Hawley, Gessner, G., Ninth Edition, Van Nostrand Reinhold Company, or labelled with a "severe toxicity" rating of 3 by any route in Dangerous Properties of Industrial Materials, Sax, N. Irving, Fourth Edition, will require supplemental approval from the Department prior to that waste material's disposal in Secure Landfill #3.

b. A waste material containing any organic chemical designated by OSHA as a carcinogen, in concentrations in excess of 2 percent by weight, or exceeding a total of 100 lbs. for that organic OSHA carcinogen within SLF #3 will require supplemental approval from the Department prior to that waste materials disposal in Secure Landfill #3.

c. Waste materials containing the controlled contaminant components listed in Section 6 of the February 27, 1979 Engineering Report are not permitted for disposal in Secure Landfill #3 in any measurable quantities without supplemental approval from the Department.

d. Waste materials containing radioactive isotopes, explosives, shock sensitives, or pyrophoric substances are not permitted for disposal in Secure Landfill #3.

e. No wastes or waste mixture shall be placed or created in Secure Landfill #3 that possess an NFPA Reactivity Hazard Rating of 3 or greater.

f. No waste or waste mixture shall be placed or created in Secure Landfill #3 that possess an NFPA Flammability Hazard Rating of 3 or greater, furthermore:

1. No wastes with a flash point of less than 80°F are permitted in Secure Landfill #3.

2. No wastes from which natural biological activity may create within the Landfill chemical products having an NFPA Flammable Hazard Rating of 3 or greater are permitted in Secure Landfill #3.

6. No waste or antagonistic waste mixture shall be placed or produced in Secure Landfill #3 which possess the chemical or physical-chemical ability to penetrate the compacted clay and synthetic membrane liners.

7. No waste or waste combinations shall be placed in Secure Landfill #3 which are capable of generating gaseous contaminants considered to be unnatural to the environment or which contain controlled contaminants easily capable of becoming airborne, unless it is suitably containerized.

8. No waste or waste mixtures which possess a pour point under ambient operating temperatures shall be placed into Secure Landfill #3 unless it is suitably containerized.

9. No waste or waste mixtures which contain in excess of 15 percent by volume of free liquid at its infinite settling point shall be placed in Secure Landfill #3.

10. No containerized waste shall be placed in Secure Landfill #3 that contain in excess of 15 percent free fluid by volume at it's infinite settling point.

11. Unless special cover components are provided to safely react with these types of contaminants to cause adsorption, precipitation, or

complexation, reducing solubility in situ, the following solubility limitations shall apply to all wastes or waste mixtures which may be placed or created in Secure Landfill #3.

a. Common Contaminant Components that have a solubility in water at 25°C in excess of 10 percent by weight without prior Department approval.

b. Group I and Group II Controlled Contaminants, and selenium, tellurium, and beryllium and their compounds that have a solubility in water at 25°C in excess of 0.05 percent by weight.

c. Hazardous oxidizers, inorganic acid sensitive anions, and acid or acid generating contaminants in excess of 2.0 percent by weight, or

d. Group III Controlled Contaminants that have a solubility in water at 25° in excess of 0.10 percent by weight.

12. Copies of daily grid work sheets are to be available during inspections and submitted weekly to the Niagara County Health Department. A concise waste description, adequately referenced in key form, shall be included in the report. A waste material recording and coding system with nomenclature, areas and waste descriptions compatible with the system used for SLF-2 shall be used.

13. Within one week of the completion of each increase in internal berm height to accommodate an additional layer of drums, a certification by a New York State License Professional Engineer with experience in soil engineering shall be submitted to the Department. Said certification shall include soild data and verification that the berm was constructed in accordance with approved plans.

14. Maximum leachate level at the leachate pumps shall not exceed two (2) feet above the lowest elevation of the floor of the area being drained. Inner leachate withdrawal operations are to begin when an action level of twelve (12) inches innage is reached or as specified in the Department approved HMCP.

15. The internal leachate shall be incinerated or treated in a system approved in writing by the Department for the treatment of leachate. No waste materials or antagonistic waste mixtures shall be placed or produced in the Secure Landfill #3 that result in leachate which cannot be treated effectively.

16. Placement of intermediate cover material shall be accomplished in such a manner as to minimize void space between drums.

17. If a practical alternative method of processing, reclaiming or destruction becomes available for a specific waste, the Permittee should

pursue with the Department the feasibility of using such an alternative method. If a method of destruction becomes available for a specific waste of long-term concern, approval may be withdrawn to landfill that waste at that time.

18. Standpipes are to be covered at all times during site operation (except when pumping leachate) and after closure.

19. Exterior and interior side slopes forming Secure Landfill #3 shall be inspected monthly for slumpage, erosion and other structural problems. All observed problems shall be reported to the Department within 24 hours.

20. After landfill closure, leachate levels in the standpipes shall be monitored and pumped automatically utilizing permanently installed sensors, pumping equipment and receiving vessels as specified in the MMCP. Dual leachate pumps shall be provided, each to serve as stand-by for the other and automatically controlled to operate independently or together. Leachate pumps shall be fitted with power failure and high leachate level indicator alarms centrally located at a place of continual, if not continuous, attendance.

21. The Permittee shall submit a P.E.'s written certification, including as-built drawings, that the closure construction is in accordance with approved report, plans, drawings and specifications.

22. Wastes contaminated with PCB's shall be stored and disposed of in accordance with Federal laws, regulations, permits and approvals.

(Continued)

23. A secondary membrane liner consisting of a minimum of 80 mil high density polyethylene shall be placed in the bottom of the Double Secure Cell (Subcell #V). This liner shall extend a minimum of 8 feet up the sides of this subcell. This liner shall be placed above the Hypalon liner system and sandwiched between twelve (12) inch layers of recompacted clays having a hydraulic conductivity of 10^{-7} cm/sec or less compacted to a Modified Proctor density of 90% or greater. Truck access shall be over, rather than through this subcell internal berm.

24. Upon completion of the installation of the Hypalon liner the Permittee shall notify the Department. The Permittee shall not place any clay material on top of the Hypalon liner until after it receives Department approval. The Hypalon liner shall be placed in accordance with the plans and in accordance with all manufacturers recommendations. The first two lifts of clay material shall be placed above the liner system in 4 inch (maximum) lifts and compacted with a vibratory roller that is not equipped with protrusions. Sheepsfoot rollers may be used to construct additional lifts after the initial two lifts. Detailed plans shall be submitted to the Department regarding the above.

25. The epoxy joint for each additional section of the leachate standpipe shall be inspected by the Department prior to its burial with additional wastes. Vertical and horizontal alignment of the leachate standpipe shall be constructed and maintained precisely. Shifting of the jointed sections shall be minimized by careful placement and compaction of materials about them during the operational life of the secure landfill.

26. Stringent quality control shall be maintained over the placement of the compacted clay. The Permittee shall submit materials and equipment test results as performed by P.E.'s experienced in that particular specialty (i.e., a soils engineer certifying testing of clay permeability after placement and compaction). The quality control shall be as outlined in the Soderholm report. A soil engineer shall supervise and inspect the placement. Samples shall be taken of the moisture content, degree of compaction, and other pertinent factors of each lift, and daily logs shall be maintained and submitted to the Department weekly. Each load of clay shall be inspected visually and any load which does not resemble the clay for which permeability data have been submitted shall be rejected. Only those clays known as the Niagara Mohawk Power Corporation Clays as outlined in the Soderholm report shall be utilized as barrow without specific Departmental authorization. The Permittee shall report to the Department on a daily or other agreed frequency the status of the construction activity regarding hauling and placement of this clay. All placement and compaction of clays shall be in accordance with previously approved techniques and controls. Hydraulic conductivity shall be a maximum of 10^{-7} cm/sec for all floor and sidewall core construction; moisture content shall be controlled and a 90% Modified Proctor density achieved.

27. All exposed clays previously deposited at the Secure Landfill #3 site shall be excavated to such a degree as necessary to expose non-weathered clays that exist insitu at a permeability of 10^{-7} cm/sec or less. The subsequent clay lift used to form the side cores shall be keyed by scarification into non-weathered clays.

28. The internal leachate collection system within each subcell shall be modified to improve the hydraulic communication throughout the whole subcell floor. This shall be done by the construction of properly designed and spaced drainage ways perpendicular to the vitrified clay drain tiles. Plans detailing the design of these shall be submitted to the Department for approval prior to construction of this leachate system.

29. The facility shall be constructed under the supervision of a person or firm registered to practice professional engineering in the State of New York.

30. The Permittee shall submit a P.E.'s written certification, including as-built drawings, that the facility and appurtenances were constructed in accordance with approved reports, plans, drawings and specifications. Such submittals shall be prior to the placing of any waste material.

31. The Permittee shall coordinate construction scheduling with the Department to enable a reasonable opportunity for supplemental inspection by Department staff prior to burying or otherwise obscuring the work.

32. The Permittee shall submit, on a weekly basis, copies of daily and special logs of construction activities detailing such items as (but not limited to) dates, locations and results of material tests, construction progress, special equipment or practices used to perform the work, etc.

33. The Permittee shall submit for approval by the Department revised plans to reflect the above special conditions within 30 days.

34. Waste shall not be placed in Secure Landburial Facility #3 prior to written approval by the Department to be issued only after compliance with all conditions specified herein and in the operation permit as appropriate.

NOTICE OF PERMIT

– for:

☒ CONSTRUCTION ☐ INITIAL ISSUE ☐ REISSUANCE
☐ OPERATION ☐ RENEWAL ☐ MODIFICATION

has been issued to: Newco Waste Systems, Inc. Niagara Recycling, Newco Chemical Waste Systems, Inc.

address: 4626 Royal Avenue Niagara Falls, New York

for a project described as: Construction of Secure Landfill Number 3

under the Environmental Conservation Law,
Article 27, Title 5, Part 360 (Solid Waste Management Facilities)

NOTE:
- This Notice of Permit must be posted on the project site in such a manner that it is protected from weather and is in a location readily visible to the public.
- A copy of the Permit with the general and special conditions noted thereon will be shown to anyone upon request.

Issuing-Officer

NYS Department of Environmental Conservation–
584 Delaware Avenue Buffalo, New York 14202
Address

2026	October 27, 1979	October 27, 198
Permit No.	Issue Date	Expiration Date

New York State
Department of Environmental Conservation
47-12-2 (6/77)

PERMIT

Under the Environmental Conservation Law, Article 27, Title 7, Part 360

PERMIT NO.: 2268
EXPIRATION DATE: [illegible]tober 27, 1[illegible]

☐ CONSTRUCTION ☐ OPERATION
☐ INITIAL ISSUE ☐ RENEWAL
☐ REISSUANCE ☐ MODIFICATION

PERMIT ISSUED TO: [illegible]
ADDRESS OF PERMITTEE: See below
TELEPHONE NO.:

LOCATION OF PROJECT: Town Niagara [illegible] Falls
County: Niagara
Environmental Conservation Regional Office: Region 9-58[illegible] Avenue, Buffalo N.Y.

DESCRIPTION OF PROJECT: [illegible] Facility
ON-SITE SUPERVISOR: [illegible]

GENERAL CONDITIONS

1. The permittee shall file in the office of the Environmental Conservation Region specified above, a notice on intention to commence work at least 48 hours in advance of the time of commencement and shall also notify said office promptly in writing of the completion of the work.
2. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation who may order the work suspended if the public interest so requires.
3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.
4. All work carried out under this permit shall conform to the approved plans and specifications. Any amendments must be approved by the Department of Environmental Conservation prior to their implementation.
5. The permittee is responsible for obtaining any other permits, approvals, easements and rights-of-way which may be required for this project.
6. By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with Part 360 and the special conditions. Any variances granted by the Department of Environmental Conservation to Part 360 must be in writing and attached hereto.

~~SPECIAL CONDITIONS~~

Modification of Permit #2025, issued to:

Niagara Recycling, Inc. - 130[illegible] Military Road, Kenmore, N.Y. 14217

[illegible] International, Inc. - [illegible]imore Road & Niagara Falls Blvd., Niagara Falls, N.Y.
(formerly Newco Chemical Waste Systems, Inc.)

Newco Waste Systems, Inc. - 4626 Royal Avenue, Niagara Falls, N.Y. 14303

[illegible] Chemical Waste Realty - 1050 Military Road, Kenmore, N.Y. 14217

SPECIAL CONDITIONS

1. Except as specifically set forth in this permit modification, ther terms of permit #2025 remain in full force and effect.
2. Paragraph 2, page 2 of 19, line 6: add ". . . on the site, excluding the operations of scrap metal, foundry sand metal recovery, lime excavation and sanitary landfill. However, a pre-closure monitoring estimate for the sanitary landfill shall be provided. Within 30 days . . ."
3. Paragraph [illegible], page 2 of 19, line 4: add ". . . for each operating facility on site, excluding scrap metal, foundry sand metal recovery and lime excavation, the name of a proposed . . ."

ISSUE DATE	ISSUING OFFICER	SIGNATURE
[illegible]	[illegible]	X

4. Paragraph 3, page 2 of 19: delete the third sentence and replace with "The trust fund is to be established by periodic payments in an agreed amount and manner so that closure costs accrue by October 27, 1982 as set forth in the various closure escrow agreements accepted by the New York State Department of Environmental Conservation, a bond being maintained in the interim in an amount equal to the value of the trust fund remaining to be accrued, except that closure costs for the sanitary landfill shall be maintained by a performance bond."

5. Paragraph 4, page 3 of 19, line 6: add "as to facilities already closed or to become close excluding scrap metal, foundry sand metal recovery and lime excavation, sanitary landfill and an estimate . . ."

6. Paragraph 6, page 3 of 19: add a third sentence "If operating hours of critical areas of the facility are extended beyond those indicated in the engineering reports and testified to in the hearing, the $80,000 will be subject to a proportional increase to the extent necessary to maintain inspection during the hours of operation."

7. Paragraph 7, page 3 of 19, line 5: delete " . . . and the Buffalo Avenue site in Niagara Falls".

8. Paragraph 8, page 4 of 19, line 16: delete " . . . lime reclamation, metal recovery from foundry sand and scrap metal recovery . . ."

Page 5 of 19, delete paragraph 13, 14, 15 and 16.

0. Paragraph 18, page 5 of 19: add a sentence "Any spillage in the drum storage area shall be immediately cleaned up in a manner which will preclude odorous or toxic vapor emissions

Paragraph 25a, page 6 of 19: delete the second sentence and replace with "One additional operable pump shall be provided and stored in a place of ready access at all times, so as to readily be available for the purpose of replacing those in the standpipes, should failure occur; inoperable pumps shall be replaced within 48 hours of failure."

2. Page 6 of 19: add a new paragraph 26: "The six digit waste segregation and description co shall be expanded to incorporate disposal by intermediate and sanitary landfilling and disposal by treatment in the wastewater treatment plant. The expanded coding system shall be submitted for review by October 27, 1980 and implemented within one week of approval."

13. Page 6 of 19: add a new paragraph 27 "Vehicles entering a secure landburial or intermediate landfill facility and either coming in contact with waste therein, or having been contaminated with waste products delivered, shall be cleaned of all such material prior to leaving the facility. Vehicles or equipment, which have entered a secure chemical or sludge management facility, shall be inspected for gross contamination prior to leaving such facility. Gross contamination on wheels or trucks will be physically removed, to prevent contamination of on-site roads leading to the truck wash facility."

Page 6 of 19: add a new paragraph 28 "CECOS will request all haulers utilizing the Pine Avenue Site to provide evidence to management that they possess valid waste hauler permits, as stated in the CECOS Facilities Operating Plan.

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rmit# 2268 Page 2 of 4 Issue Date July 31, 1980 . Issuing Office:

Page 6 of 19: add a new paragraph 29 "On site monitoring personnel shall be notified in advance of any critical operations during non-routine hours such as the landfilling of waste or the construction of new facilities."

16. Page 6 of 19: add a new paragraph 30: "Unless other evidence having been submitted to the Department demonstrating the lack of need of training, a training program shall be given to all site operating employees. The minimum curriculum shall include knowledge of types of wastes, safety precautions, accident prevention response to equipment failure and employee hazards. Training records are to be maintained at the site for inspection by Department personnel. Within six months after the date of their employment or assignment on the site as operating personnel, employees must have completed a training program. Employees hired as site operating personnel must not work in unsupervised positions until they have completed the training requirements. CECOS agrees to complete within six (6) months of the date of issuance of this permit, the training program requirements specified in Section 264.16 "Personnel Training, 40 CFR Part 264."

17. Paragraph 3, page 7 of 19: delete the second sentence and replace with "One additional operable pump shall be provided and stored in a place of ready access, at all times, so as to be readily available for the purpose of replacing those in the standpipes, should failure occur; inoperable pumps shall be replaced within 48 hours of failure."

18. Paragraph 2, page 8 of 19, last sentence: add" . . . within the Intermediate Landfill, except that individual streams that do not cause the average composition of the landfill to exceed stated limitations for each cell and which do not have levels of contaminants in leachate (as determined by the EPA procedure defined in Section 261.24, 40CFR Part 261; higher than one thousand times federal primary drinking water standards for metals or organic contaminants may be submitted to the Department for review for disposal approval by the Department on an individual basis. For metals or organic contaminants listed in New York State Groundwater Standards but not in federal primary drinking water standards, state standards shall apply, with the same multiplier.

19. Paragraph 1, page 13 of 19, line 3: add" . . . the subsequent addendum dated July 7, 19 and further revised in the March 26, 1980 amendment, except as modified by special conditions . . ."

20. Paragraph 2, page 13 of 19, line 3: add " . . . report addendum, as further revised by the March 26, 1980 amendment . . ."

21. Paragraph 2d, page 13 of 19, line 1: change to "Wastes are to be disposed of in this subcell in accordance with approved plans and reports."

22. Paragraph 3, page 14 of 19, line 3: add " . . . of the July 7, 1979 revision of the report as further revised by the March 26, 1980 amendment."

23. Paragraph 3, page 14 of 19, line 5: add " . . . revision of the report, as further revise by the March 26, 1980 amendment."

24. Paragraph 20, page 17 of 19, delete the second sentence and replace with "One additional operable pump shall be provided and stored in a place of ready access, at all times, so as to be readily available for the purpose of replacing those in the standpipes, should failure occur; inoperable pumps shall be replaced within 48 hours of failure."

25. Page 17 of 19, add a paragraph 23 to read: "A schedule for the implementation of the recommendations listed in the City of Niagara Falls Fire Department inspection report dated February 12, 1980 shall be submitted by September 1, 1980."

26. Page 17 of 19, add a paragraph 24 to read: "No waste is to be landfilled in grids #51-54, 58 and 63 that has an NFPA flammability or reactivity rating of 1 or greater."

27. Page 17 of 19, add a paragraph 25 to read: "No machinery which is routinely used for landfill operation shall be permitted in the flammable cell or in grids 55-57 and 64-66 unless it has been fitted with safeguard devices required for a GS, LPS or DS classificatio by the Underwriters' Laboratories, such classification to be certified by an authorized representative of UL. Prongs on fork-lifts shall be bronzed or otherwise made spark resistant."

28. Paragraph 3, page 18 of 19, add "The 10% free liquids limitation shall not apply to wastes approved by the Department for disposal in the Sanitary Landfill that have been generated by spill clean-up operations or consist of materials approved by the Department for utilization in the Sanitary Landfill as dust suppressants."

29. New monitoring wells or sampling points shall be installed 90 days from the date of approval.

30. The effective date of this permit shall be ten (10) days from the date of issuance.

NOTICE OF PERMIT

for:

☐ CONSTRUCTION
☒ OPERATION

☐ INITIAL ISSUE
☐ RENEWAL

☐ REISSUANCE
☒ MODIFICATION

has been issued to: Niagara Recycling, Inc., CECOS International, Inc., Newco Waste Systems, Inc.
WLF Chemical Realty

address: Niagara Recycling-1300 Military Road, Kenmore, N.Y. [illegible], CECOS International-Walmore Road & Niagara Falls
Blvd., Niagara Falls, N.Y.; Newco Waste Systems, Inc. [illegible] Avenue, Niagara Falls, N.Y.; WLF [illegible]
Waste Realty-1050 Military Road, Kenmore, N.Y.

for a project described as: Pine Avenue/Packard Road Facility

under the Environmental Conservation Law,
Article 27, Title 5, Part 360 (Solid Waste Management Facilities)

NOTE:

- This Notice of Permit must be posted on the project site in such a manner that it is protected from weather and is in a location readily visible to the public.
- A copy of the Permit with the general and special conditions noted thereon will be shown to anyone upon request.

Issuing Officer C. McMahon / KB

[illegible] Delaware Avenue, Buffalo, New York 14202
Address

[illegible]
Permit No

7/31/80
Issue Date Expiration Date

New York State
Department of Environmental Conservation

APPENDIX II

QUESTIONS AND ANSWERS SUBMITTED FOR THE RECORD

Questions for Norman H. Nosenchuck
in connection with the Subcommittee on Natural Resources,
Ariculture Research and Environment on December 8, 1982.

1. You have expressed a concern that EPA's performance standards may not be uniformly applied by EPA Regional Administrators.

QUESTION (a) What specific recommendations do you have to insure that these standards are applied fairly?

ANSWER Sound guidance documents for implementing the hazardous waste regulations are necessary. They should be as specific as possible without being overly restrictive. More importantly, an independent program auditing unit should be established in Washington, D.C. This unit would audit each of the ten EPA Regions at least once a year (preferable twice) to ascertain how they are implementing the regulations, what levels of stringency they are requiring, etc. A centralized program auditing operation such as this is essential for the successful implementation of any decentralized program.

QUESTION (b) Would you recommend that EPA promulgate technology based standards similar to those required by the Clean Water Act?

ANSWER There is place for technology based standards in the RCRA program. The approach that EPA took regarding the management of PCB wastes under the Toxic Substance Control Act Regulation (40 CFR 761) is one example of how technology based standards could be applied to hazardous waste regulations.

2. You have appeared before Congress on numerous occasions to comment on the hazardous waste management policies and provisions of the Resource Conservation and Recovery Act (RCRA).

QUESTION (a) Do you believe EPA's interim final regulations provide disincentives for the development of alternative treatment technologies such as incineration and detoxification?

ANSWER Yes, by allowing hazardous waste to be discharged directly to public sewers without having to meet any standards and by not placing any limitations on what wastes can be landfilled, with the exception of liquids, the regulations cause these methods of waste management to be used in deference to advanced methods such as incineration or detoxification. As in other aspects of business, an industry will always choose that which has the least cost to them.

QUESTION (b) What regulatory changes would you make to allow these technologies to develop?

ANSWER The RCRA regulations should contain requirements that by a certain date, specific wastes or classes of wastes not be landfilled, that they be incinerated, neutralized, fixed, chemically destroyed or handled by other means of treatment.

Secure land burial (landfilling) is not an appropriate technology for many hazardous wastes and is not the optimum technology for the disposal of others. Secure land burial should be used only for those hazardous waste for which secure land burial has been shown to be environmentally sound and for which no other means of treatment or disposal is feasible. Incineration, neutralization, fixation, chemical destruction and other means of treatment are preferable to land burial because they afford better long-term protection of human health and the environment. Of greatest concern are wastes that contain chemicals which (1) are environmentally persistent; (2) have high environmental mobility, particularly in a soil environment; (3) are human carcinogens; (4) are very highly toxic to humans, plants and animals; or, (5) possess highly hazardous physical properties, such as explosiveness or low flash points.

EPA's continuing failure to clearly and definitively come out with a national policy not only prohibiting the types of waste described above from landfills but, in addition, forcing the transition from secure land burial facilities to alternative technologies (by economic incentives or legal requirements mandating alternatives), makes it very difficult for states to require the development of innovative treatment technologies for destruction and detoxification of hazardous wastes.

Without Federal action for appropriate national standards, stringent requirements on industry from that state to other states that accept land burial.

3. The objectives of RCRA include provisions for technical and financial assistance to State and local governments for the development of hazardous waste managment programs. This Administration proposed a 16% reduction ($41.7 million to $35.1 million) in FY 1983 for RCRA Subtitle C grants to the states for these management programs.

QUESTION (a) What specific state program functions do the RCRA Subtitle C grants support?

ANSWER In a general sense, RCRA Subtitle C grants support the development of State programs for regulatory control of hazardous wastes that are currently being generated or that will be generated in the future. More specifically, the grants support the establishment and training of professional/technical staff for implementation of a manifest system to track the movement and final disposition of hazardous wastes, the inspection of operative hazardous waste management facilities and assistance in related subsequent enforcement, and the permitting of hazardous waste mmanagement facilities, both existing and proposed, including the review of engineering reports, plans and specifications, and the preparation of permits for the construction and/or operation of such facilities.

RCRA Subtitle C grants cannot be used to support activities related to the investigation or remediation of inactive hazardous waste disposal sites.

QUESTION (b) To what extent do State Hazardous Waste Management Programs rely on Federal financial support?

ANSWER Almost all State hazardous waste management programs rely quite heavily upon federal financial support. No state has been able to independently finance a complete hazardous waste program at a level necessary to protect the environment and public health and safety. State hazardous waste regulatory programs are relatively cost intensive, requiring professional and technical personnel with skills and expertise that are not readily found in the currently available work force. Almost coincident with the recognized need to significantly expand hazardous waste programs has been a deteriorating economic climate that has brought fierce competition for the tax dollar. The reliance of State hazardous waste management programs upon federal financial support is of such significance that premature cessation of federal financial assistance will have a destructive influence on the ability of states to continue their hazardous waste program activities.

QUESTION (c) What impact would the Administration's proposed 16% reduction have on the ability of States to carry out viable state hazardous waste management programs?

ANSWER Last year the Administration proposed a 16% Federal budget cut for assistance to states for Federal Fiscal Year 1982-1983, under RCRA Subtitle C for hazardous waste management, from $41.7 million to $35.1 million. We surveyed the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) membership and found that at least ten states would withdraw or consider withdrawing from the RCRA hazardous wastes management program -- and establish separate state programs -- if Federal assistance under Subtitle C would be reduced as planned.

The impact cannot be identified quantatively; however, the development of state hazardous waste management programs would have been significantly hindered. The reduction would have been affected at a time that increased support was necessary to encounter inflationary trends, merely to maintain the same level of program activities. Overall, the result would have been fewer inspections, fewer enforcement actions, a reduced ability to respond adequately to proposed new projects, and the withdrawal of some states from any further favorable consideration of obtaining interim or full authorization of their state hazardous waste management programs.

QUESTION 4. Does EPA plan to phase out program support to the States for hazardous waste management activities in the next two years?

ANSWER It is very difficult to state when EPA plans to phase out program support to the states because the information that I had received,came from people who are no longer with the agency. I had heard previously from then Administrator Gorsuch that EPA was planning to phase out program support to States under RCRA Subtitle C in 1985. Perhaps, with the change over at the USEPA, with increased Congressional attention to the entire problem of hazardous waste management, and the public's concern in this area, program funding will be continued at appropriate levels. We must remember that when we talk about hazardous waste we are dealing with an issue that really transcends state boundaries. States cannot prohibit hazardous waste from coming into their particular state. Hazardous waste is interstate commerce, and as such, there has to be federal support to the states for an effective hazardous waste management program. Of course, this also means that the states will have come up with additional State funds to augment those federal funds.

QUESTION 5. How many State Governments would consider returning their hazardous waste management programs to EPA if adequate Federal funding is not provided?

ANSWER How many states would consider returning their hazardous waste management programs to EPA if adequate Federal funding is not provided is difficult to answer at this point in time. Based on information that we in ASTSWMO received when we surveyed our ASTSWMO membership last year, we found that at least ten states would consider returning their hazardous waste management programs to EPA. This of course would mean that even more responsibilities and costs would be placed upon EPA to enforce the federal program.

If adequate Federal funding is not provided to State Governments to assist them in their hazardous waste management programs, this means to me that there is no national commitment to State RCRA Subtitle C hazardous waste management programs. This means that laws, rules and regulations will not be effectively implemented in the near future. I see States giving back their RCRA hazardous waste management programs to the Federal Government. I see States taking their available resources and reprioritizing their non-hazardous and hazardous waste management activities to protect the public health and the environment within their particular states. I see a lack of state-to-state consistency. I see the

Federal Government being asked to enforce the Federal RCRA hazardous waste management requirements in various states.

Ultimately, if the Administrations' budget policies are successful, only a "skelton version" of Congress' intended Federal/State comprehensive national hazardous waste management program will ever be implemented. All the states will be losers in this situation. It will necessitate more costly Superfund cleanups and increase the prospects of severe and ongoing public health and environmental problems eminating from our inability to achieve minimum preventive protection measures in this country.

QUESTION 6. The New York City Department of Environmental Protection completed immediate response to remove the hazardous materials -- cyanide salt -- from the Star Street site because it posed an immediate threat and danger to the nearby population and a school located directly across the street. Additional planned response steps are required to remove the heavy metals that are in the floor boards of this abandoned facility. This planned response is the responsibility of the state program. What steps have been taken so far?

ANSWER Cyanide salts were removed from the site by New York City. Those wastes were much more significant than any heavy metals which may remain in the floor boards. The site was scored using the New York State scoring system for investigation under the New York State Mini-Superfund program and received a 36.5, thus, it is not included in the list of 100 to be investigated under the New York State Mini-Superfund program. The site will be included in the additional 50 sites to be given to EPA Region II for preliminary investigations by NUS Corporation.

QUESTION 7. PCB contaminated oil has been found beneath the surface of the bankrupt Quanta facility in Long Island City, as well as in the neighboring area. What efforts will be made by the New York State Department of Environmental Conservation to solve this environmental hazard?

ANSWER Samples taken at the site indicate high levels of PCB's in the soil. New York City has asked the New York State Department of Environmental Conservation to look into the situation. We are currently exploring ways to investigate the subsurface in more detail.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 16 1983

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

Honorable James H. Scheuer, Chairman
Subcommittee on Natural Resources,
  Agriculture Research and Environment
House Office Building Annex No. 1
Room 817
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

Enclosed is my response to your questions regarding Rita Lavelle's testimony of December 16, 1982. I apologize for missing your requested response date. By the time your March 3 letter was delivered to me, we had only one day to respond. Because of the nature of the questions posed, it necessarily required several days to prepare this response.

If I can be of further assistance, please contact me.

Sincerely,

Lee M. Thomas
Acting Assistant Administrator

Enclosures

Response to Questions on Testimony of Ms. Rita Lavelle

1. Bulk Liquids

   a. What percentage of this country's bulk liquid hazardous wastes are presently land disposed?

   Response: That information is not currently available. We have not collected information on how much of the hazardous waste in this country is bulk liquid, either on an as-generated or an as-disposed of basis. However, reasonable estimates of how much bulk liquid is disposed of in landfills and how many landfills dispose of bulk liquids should be available this summer when data gathered for Regulatory Impact Analyses under E.O. 12291 have been analyzed. A recent informal and incomplete EPA survey yielded only one landfill known to be receiving bulk liquid hazardous wastes. It is probable that only a very few landfills are receiving bulk liquids since RCRA regulation amendments promulgated last summer require liners and leachate collection systems that meet our permitting standards. Few landfills are now so equipped. In addition, however, there are many surface impoundments that contain bulk liquid hazardous wastes. Under the RCRA rules when these facilities close, the liquids would have to be removed or solidified. Additionally, volumes of liquid hazardous wastes are treated in land treatment facilities, and disposed of through injection wells. Land treatment is controlled under Subpart M of the RCRA regulations. Although there is some interim oversight of underground injection provided by the RCRA regulations, comprehensive control is being implemented by EPA and States under the mandate of the Safe Drinking Water Act (PL 93-523).

b. Why does EPA allow bulk liquid disposal in landfills?

Response: Bulk liquid addition may, under some circumstances, be beneficial to operators of the landfill. It may accelerate consolidation and settlement or provide nutrients to accelerate biological decomposition. Bulk liquids can be disposed in landfills in a manner that protects public health and the environment if the landfill is properly designed and operated, in accordance with our regulations. however, we have received numerous comments suggesting that addition of bulk liquids to landfills may be inappropriate. We are analyzing this information.

c. Is the Agency planning to prohibit this practice?

Response: We are currently reviewing the comments received on the bulk liquid waste regulation for landfills. We expect to complete a preliminary review this summer and may propose additional restrictions if that appears appropriate.

d. Do any alternative disposal or treatment technologies exist to handle bulk liquid hazardous wastes?

Response Yes, clearly. Most can be solidified by sorption. Additionally, many can be substantially detoxified through incineration and other treatment technologies.

2. Ground-Water Contamination

a. How many contaminated ground water sites are there in this country? Has this number increased over the last 10 years? Why?

Response This question cannot be answered in absolute terms since many inactive sites are not monitored. In 1977 we sent a report to Congress covering the information gathered to that time (See The Report to Congress: Waste Disposal Practices and Their Effects on Ground Water; EPA, January 1977). More recent information has come from the Superfund and RCRA damage case investigations. We have on file 316 documented ground-water contamination cases and an additional 329 suspected cases. With regard to operating RCRA facilities, there are undoubtedly some whose current operations are contaminating ground water. Under the RCRA rules, this spring, EPA and States will obtain the first ground-water monitoring results from landfills, surface impoundments, waste piles, and land treatment units, comparing downstream water quality against background. The results will tell us how many currently operating units of those types are contaminating ground water. We also know that some underground storage tanks for hazardous waste in California have contaminated ground water. This is another area that we are investigating. We do not know if the number of contaminated ground water sites has increased over the last 10 years. Ten years ago we had almost no knowledge in this area.

It is, however, probable that the number has increased, since migrating leachate plumes from many old sites will have first reached ground water during the period.

b. What percentage of these contaminated ground water sites have been caused by hazardous waste and disposal sites?

Response: We are unable to estimate this figure reliably because many cases of ground-water contamination have as their source sites that do not obviously have hazardous waste associated with them. Examples include municipal landfills, storage of raw materials and products, and product spills. In many cases we simply don't know and will never know whether substantial quantities of hazardous wastes were involved in, or contributed to the contamination event. Records simply weren't kept.

c. Do these regulations guarantee corrective action by facility owners and operators? Why or why not?

Response. The RCRA regulations require corrective action at units subject to the RCRA Subtitle C program. There are, however, limits to the jurisdiction of the program.

(1) The RCRA rules do not apply to facilities that did not receive hazardous wastes after November 19, 1980.

(2) The RCRA rules require owners and operators of all land disposal units receiving waste after January 26, 1983, to undertake corrective action if necessary. Those that did not receive hazardous waste after that

date are not subject to this rule. The rule is implemented through the permit process. Owners and operators of facilities that received hazardous waste after November 19, 1980, but ceased doing so before January 26, 1983, are subject to the ground-water monitoring, assessment, and reporting requirements of the Part 265 regulations. If contamination is thus discovered, the Agency may bring an action to force corrective action under Section 7003 (the imminent hazard provisions of RCRA).

(3) The regulations currently do not have provisions to assure the availability of funds to conduct corrective action. As explained in the preamble, the Agency has not yet devised a workable means to assure these funds. In the preamble to the July 26, 1982, promulgation, the Agency invited public comment on whether financial assurance is necessary in this area, and if so, how it might effectively be structured. The comments received are included in the analysis we are now doing to more clearly define the need for financial assurance and the requirements that would be effective and feasible. We intend to issue a proposed rule requiring financial assurance if the analysis shows that course to be appropriate.

3. Existing Portions Exemption

a. What number of units qualify for this exemption?

Response: The exact number cannot currently be known since it relates to the situation at the time of permitting. Our current best estimates, based on Part A application data, are that there are about 1100 facilities with surface impoundments, about 270 with landfills, and 310 with waste piles. These numbers are somewhat misleading in this context, however, since some facilities practice more than one of these activities and others will have more than one unit of a given type. We also have no way of knowing now how many will close before they are permitted.

b. What information has EPA collected to show that owners and operators of these existing portions have installed adequate groundwater monitoring systems?

Response: We just completed an evaluation that indicates that, while nearly all (97%) of the subject facility owners and operators sampled have made an attempt to comply, perhaps as many as 60% have some deficiency relative to the interim status ground-water monitoring requirements. We are giving high priority to rectifying this situation as well as to confirming the survey data.

c. What assurances can EPA provide that ground-water contamination caused by these exempted facilities will be detected and cleaned up?

Response: The Agency has identified facilities required to monitor ground water as its highest priority for compliance monitoring and enforcement. During FY 1983, all such facilities will be inspected to ensure that adequate detection systems are in place, that sampling and analysis of the ground water is conducted in an appropriate manner, and that the required information is submitted to EPA or the authorized States. In addition, in-depth review of those reports will be conducted to determine possible contamination or irregularities which could lead to contamination. If a facility is found to be out of compliance, appropriate enforcement action will be taken to correct the violation. Enforcement actions may range from informal warning letters, and administrative orders assessing penalties, to civil actions. If contamination is detected, the facility's Part B permit application can be called in so that the facility can be placed on a schedule to clean up and correct the problem.

d. What information has EPA collected on the number of facilities that could not easily and safely be retrofitted with liners?

Response. As discussed in the Preamble, we have been unable to draw the line on what constitutes an "easy and safe" retrofitting situation. So, it has not been possible to gather numbers. No statistical data has been supplied in comments on the regulations, either. We are currently reviewing the whole "existing portion" question in the light of comments received and litigation on the interim final regulations. If we conclude that another option is appropriate, we will propose it, perhaps as early as this fall.

4. Long Term Care

a. Does the Post-Closure Liability Trust Fund cover corrective action at closed facilities?

Response: As we interpret the CERCLA statute, liability for corrective action does not transfer to the Post-Closure Liability Fund during the period of owner or operator responsibility as defined by the RCRA Subtitle C regulations (i.e., for at least thirty years after closure). However, given ambiguities in the statute, and recognizing that EPA's corrective action requirements had not been established when CERCLA was enacted, it may be desirable for Congress to clarify the coverage of the Post-Closure Liability Fund. There is time to analyze this question completely, however, and to make whatever changes may seem desirable, since the first demands on the fund will not occur at least until 1988 (five years after closure of the first permitted facility).

b. What guarantees are there that this fund will be adequate to pay for future ground-water contamination cleanup?

Response: We are required by CERCLA to report, by December 1983, on the adequacy of the Post-Closure Fund and have developed a computer simulation model to assist us in making this determination. The model will allow us to analyze the effects of waste generation, disposal practices, landfill performance, legal liability, and

Post-Closure Fund policies on the supply of funds for post-closure liabilities.

c. Why is EPA allowing liability to be transferred away from the owners and operators?

Response. The liabilities are transferred by CERCLA. CERCLA's legislative history states that this transfer is necessary to encourage the siting of new hazardous waste land disposal facilities to ensure sufficient future disposal capacity.

d. Who will pay for cleanup of ground-water contamination after the 30-year period?

Response. The answer depends on the circumstances:

1. In the case of a non-permitted facility, the only options would be action under Superfund or under Section 7003 (the imminent hazards provision) of RCRA. If that action is successful, the responsible party would ultimately pay.
2. In the case of a permitted facility where contamination is discovered before the end of the 30-year nominal post-closure care period, the owner or operator is required by the RCRA rules to clean up the groundwater no matter how long it takes--even if that is longer than the 30-year period.
3. In the case of a permitted facility where contamination is discovered after the 30-year nominal post-closure period, the Post-Closure Liability Trust Fund would be used.

5. Risk-Cost Model

   a. Is EPA aware of the OTA and SAB criticism of this model?

      Response: Yes, we have read OTA's analysis and we met with the SAB.

   b. Does EPA plan to incorporate the OTA and SAB suggestions in the final model? Why or why not?

      Response. Yes, to the extent practical and appropriate. We have begun the work necessary to respond to the comments.

6. Air Emissions

   a. Is EPA aware of these (air emission) problems? What does the Agency plan to do about it?

      Response: In the Preamble to the July 26, 1982 standards we discussed at some length the problems we are having in trying to assess the need for air emission requirements. While theoretical calculations give worrisome predictions relative to the possible emissions of volatile organic chemicals (VOC's), aerosols, and dusts, there is remarkably little hard data relative to emission concentrations and the extent to which damage has actually occurred. Part of the problem here is that sampling for many of these contaminants from non-point sources is technically difficult (and controversial) and very costly. Also, while we are aware of several possible control technologies, their efficiency and how they can be practically applied require study. Further, the levels of emissions, their constituents, and potential control technologies appear to be highly waste specific. To rectify these problems, we have ongoing an effort that includes sampling at operating sites (using the latest sampling and analytic technology), development of predictive models for emissions, estimation of emission loads and potential impacts, and evaluation of technical alternatives that are or may be effective in controlling these emissions. As our work identifies specific wastes that pose an unacceptable emission potential, we will consider that waste to be a candidate for prohibition from land disposal and storage. Individual prohibitions of this type may be put into effect before comprehensive generic regulation is completed.

7. Requests for Information

a. Specific hazardous wastes or classes of hazardous wastes which EPA is considering banning from land disposal because of their persistence, toxicity, or mobility.

Response: We are about to begin a two year study that will generate a list of candidate wastes as a first output. We expect to have a preliminary list by August 1983.

b. A comparative analysis of those hazardous wastes banned from land disposal by the U.S. EPA and those banned or scheduled to be banned by the State of California.

Response: A copy of such an analysis is enclosed.

c. An appraisal of the positive and negative aspects of the State of California's plan to phase out land disposal of certain hazardous wastes.

Response: The previously mentioned analysis also covers this area.

d. Additional technical information on the intended goals of EPA's July 26, 1982 Interim Final regulations for land disposal of hazardous wastes.

Response: The Preamble to the July 26 issuance and our previous testimony thoroughly discuss the goals, strategies, and rationale for the rules now in effect. If there is some other particular information that you desire, please identify it and we will try to supply it.

RESTRICTING DISPOSAL OF WASTES ON THE LAND CALIFORNIA PLAN COMPARED TO RCRA PROGRAM

Over a 25-month period beginning June 1, 1983, the California Department of Health Services intends to ban certain wastes from land disposal. The schedule is as follows:

June 1, 1983 - Liquid wastes containing cyanide (greater than 1000 mg/l)

January 1, 1984 - Liquid wastes containing toxic metals (greater than 10,000 x drinking water standards in the waste for arsenic, cadmium, chromuim, lead, mercury, nickel, selenium, thallium

- Liquid acid wastes (pH less than 2)

- Liquid wastes containing PCBs (greater than 50 mg/l)

January 1, 1985 - Liquid waste containing halogenated organics (greater than 1000 mg/kg)

July 1, 1985 - Organic sludges and solids containing halogenated organics (greater than 1000 mg/kg)

The Department of Health Services (DHS) must demonstrate 45 days before each of these dates that sufficient alternative capacity is available. Otherwise, the date is postponed. Also, any person or company may petition DHS for a variance for a specific waste stream or continued land disposal limited to a specific site.

With regard to the Federal RCRA program, the statement delivered on December 16, 1982, to the Subcommittee (statement by Rita M. Lavelle, then EPA's Assistant Administrator) outlined the current design and operating standards which apply to land disposal facilities with the primary objective of averting or controlling groundwater contamination. Additionally, the Agency has already "banned" certain hazardous wastes from disposal in the land. Currently, under the EPA/RCRA rules, containerized liquids of all types, hazardous or not, are banned from landfills (except specially packed laboratory quantities). This is because containerized liquids will leak in the future, often after closure, resulting in void space that may collapse, causing stresses on the landfill cap that could impair its function. The landfill cap must not be breached since it is the mechanism that provides long-term protection into the future by limiting leachate formation. Bulk liquids do not cause a subsidence problem with the cap and in some cases may reduce the potential for subsidence by causing more rapid consolidation of the solid contents. Bulk liquids, in and of themselves, do not necessarily create any particular problem in the landfill if the liner and leachate collection system are designed to deal with them. Our rules attempt to ensure that this will be the case.

Ignitable wastes are also banned from landfills under Federal RCRA rules, unless the act of placing the waste in the landfill (e.g., due to mixing) renders the waste non-ignitable. Solid ignitable wastes in containers may also be landfilled under certain stringent conditions designed to prevent ignition. Containerized liquid ignitables are precluded because of their liquid character. The California plan will not specifically ban ignitables.

Under RCRA rules, most cyanides are banned from land disposal because they are reactive, a class of wastes not permitted in land disposal facilities. They are a problem because upon reaction, they may release toxic gases. Our ban is conditional in that if cyanide wastes are treated or handled in such a way as to eliminate their reactivity, they may be landfilled. California will ban liquid cyanides, which includes most of the problem ones, but does not specifically address other reactive wastes.

Under the Federal RCRA rules, acidic wastes (as well as any other waste) are restricted from land disposal if they would damage the liner or other structural components of the facility, or if they would be incompatible with other wastes, or produce problem emissions. If, however, such wastes are neutralized or managed in such a manner that they do not cause the above problems, they can be placed in a land disposal facility on a case-by-case basis.

PCB wastes, including the liquid variety to be banned by California, are Federally controlled by the Toxic Substances Control Act rather than RCRA. Those wastes pursuant to TSCA rules containing greater than 500 ppm PCB's are banned from land disposal.

In sum, the California plan and EPA/RCRA rules overlap to a certain degree. Certain wastes are already banned or restricted by the EPA/RCRA rules (e.g., containerized liquids, ignitables, reactive wastes, acids, under certain circumstances, PCB's etc.). The California plan will ban certain other wastes not now restricted by the Federal rules (e.g., toxic metals, certain bulk liquids, and halogenated organics as a class). We have not adopted all of the prohibitions that are included in the California plan because we are not convinced at this point that it is necessary to completely ban such wastes in all cases in order to protect human health.

We have embarked upon a program to identify wastes that pose a continuing significant hazard in the land environment. When we complete this, we shall further limit land disposal. In this regard, we expect to propose new restrictions in the summer of 1984. It is not clear that the planned California program, when fully effective in 1985, will result in fewer wastes going to land disposal than will the EPA/RCRA program. The rules currently in force in California are not now as restrictive as the Federal RCRA rules.

On philosophic grounds, we do agree with the general premise that certain wastes should not be put in the land because there is always the potential for wastes to migrate from the facility in the future. This does not mean that the practice is necessarily unsafe; it depends upon the toxicity of the material, rate of release, extent of exposure to population, attenuation in the environment and other factors. But, it is clear that land disposal requires oversight of the waste for a long time. If, on the other hand, the wastes are recycled, treated, or destroyed, such long term oversight is not necessary. However, recycling, treatment, and incineration themselves also entail emissions to the environment. Therefore, it is the relative risk that must be considered. Under RCRA, in order to ban any waste or group of wastes from land disposal, we must have information and support for a position that management of that waste in the land poses an unacceptable risk. Where we have such information and data, we have, and will continue to ban or restrict such practices. In that regard, we will be carefully reviewing the information that develops in California as we proceed with our activities.

Even if we ban many or most wastes from land disposal, there will still be the need to dispose of some wastes on the land. Examples include heavy metal residues from incineration and other treatment processes and very large volume wastes such as occur from time to time in accidents and disasters (e.g., wastes from the current Times Beach flood). It is necessary, in any event, to closely control whatever residual land disposal remains if we are to protect human health and the environment. This is what our recently promulgated regulations attempt to do by: (1) ensuring that the best design technology and careful management are employed to contain the waste during operation, (2) requiring that a state-of-the-art final cover is emplaced at closure to reduce the rate of release of constituents to a bare minimum, and (3) requiring long-term monitoring and possibly cleanup of the groundwater as a backup in the event contamination does occur. California does not currently have such controls over land disposal of the hazardous wastes they do not plan to ban. We think it is important that they adopt similar rules to control this disposal.

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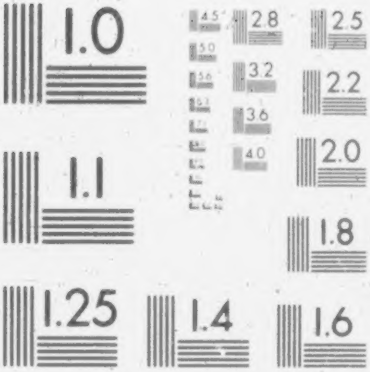

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